NIAGARA ESCARPMENT STUDY FRUIT BELT REPORT AUGUST 1968

ONTARIO

NIAGARA ESCAPRMENT STUDY

FRUIT BELT REPORT

AUGUST, 1968

Niagara Escarpment Study Group
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NIAGARA ESCARPMENT STUDY

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A special word of thanks is extended to the following people: Dr. R.R. Krueger (University of Waterloo) for his extensive research material on the Niagara Fruit Belt; Mr. B.E. Beeler (Department of Agriculture and Food) for the use of the 1965 aerial photographs of orchards and vineyards; Miss G.A. Smith (Regional Development Branch) for the provision and checking of agricultural sources and material; and Dr. L.G. Reeds (McMaster University) for his active co-operation in discussions on the Study Area.

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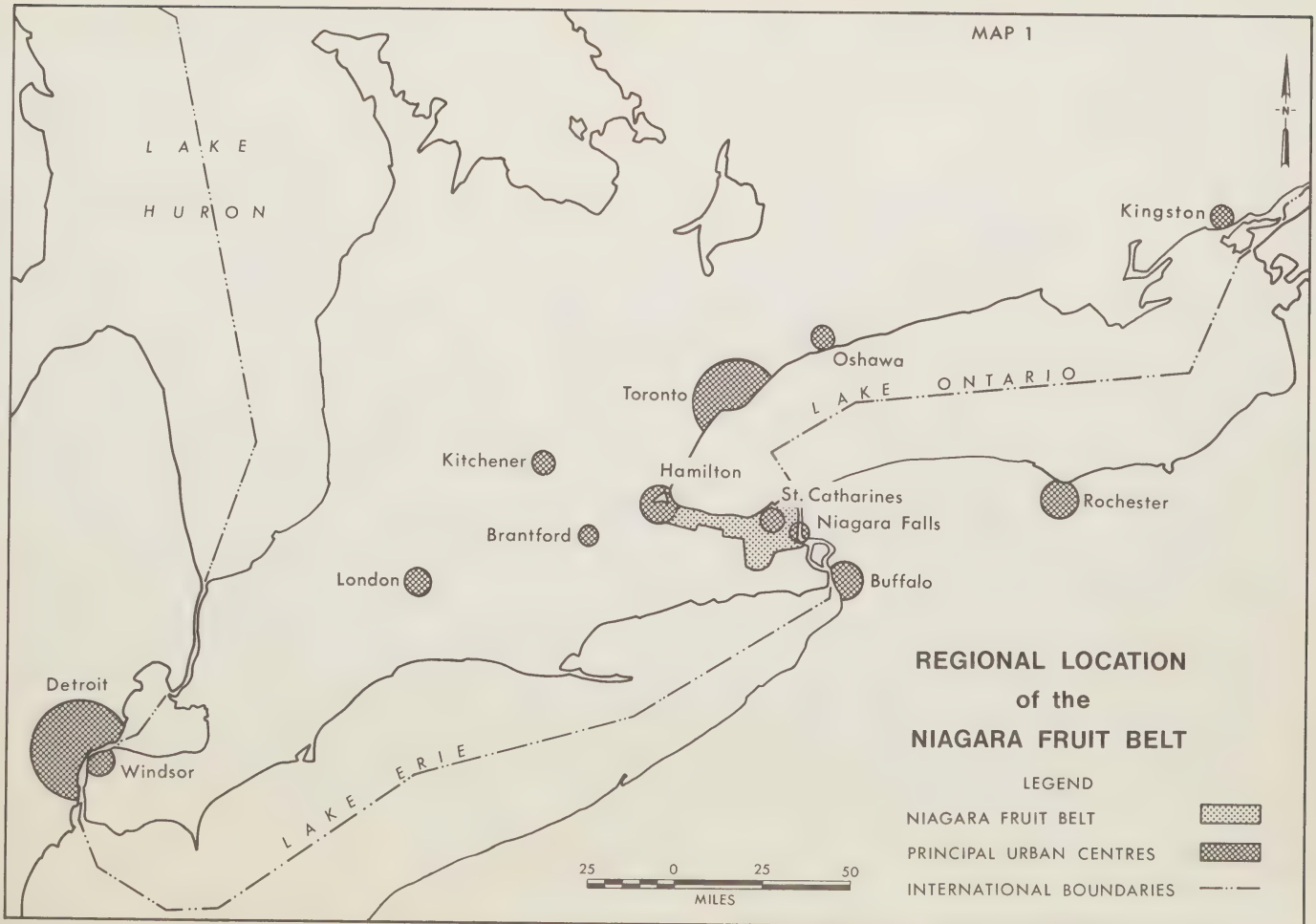

MAP 1
N
LAKE HURON
Kingston
Oshawa
Toronto
LAKE ONTARIO
Kitchener
Hamilton
St. Catharines
Rochester
Niagara Falls
Brantford
London
Buffalo
Detroit
Windsor
LAKE ERIE
25 0 25 50
MILES
REGIONAL LOCATION
of the
NIAGARA FRUIT BELT
LEGEND
NIAGARA FRUIT BELT
PRINCIPAL URBAN CENTRES
INTERNATIONAL BOUNDARIES

CHAPTER I

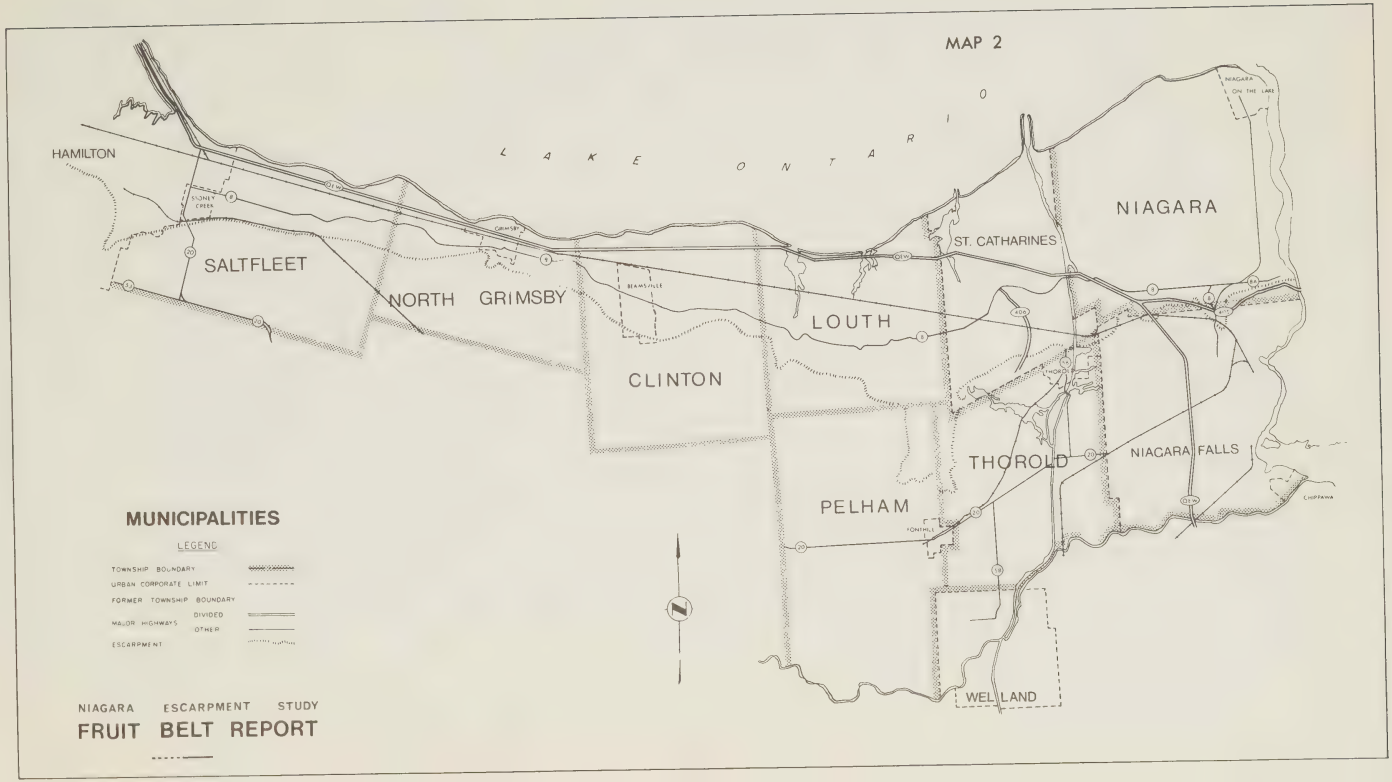
INTRODUCTION

The Niagara Escarpment Study established in June, 1967 was asked to consider, as an issue related to the preservation of the Escarpment, the problem of the Niagara Fruit Belt. The terms of reference and work programme adopted by the Study last July, envisaged a two stage process. In the first stage, the Study would (i) establish the present facts and trends in fruit production, land use and population; (ii) estimate the future demand for land for all purposes, on the basis of established trends; (iii) examine the policies and plans of local, regional and provincial agencies with respect to the region, and indicate the resulting development pattern that will emerge; and (iv) on the basis of the foregoing, make recommendations concerning a policy for the Niagara Fruit Belt.

The second stage, which was considered contingent on the results of the first stage, would include two major lines of work (i) the preparation of a comprehensive regional development plan that would provide a sound framework for future development of all types; and, related to this (ii) the working out of a strategy, based on a study of the inter-related factors of production and marketing, aimed at defining the conditions essential for a sound agricultural economy in the region. This report is concerned with the first of the projected two-stage study.

The Niagara Fruit Belt is defined for the purposes of this Study as an area of approximately 386 square miles, extending

from the Niagara Area to Hamilton, and including the following municipalities: townships - Saltfleet, North Grimsby, Clinton, Louth, Pelham, Thorold, Niagara; towns and villages - Stoney Creek, Grimsby, Beamsville, Thorold, Fonthill and Niagara-on-the-Lake, and cities - Hamilton, St. Catharines, Niagara Falls, Welland (Maps 1 & 2). This area, which is based on boundaries established by the Krueger study of some ten years ago includes the entire area above and below the Niagara Escarpment in which orchards and vineyards occur. These crop patterns, as explained in Chapter III, reflect unique conditions of climate and soil. The operation of these factors results in a functional Fruit Belt boundary that extends southward well beyond the edge of the Escarpment - from about two miles, to ten miles in the area of the Fonthill Kame. Thus, "the Niagara Escarpment literally cuts through the heart of the Niagara Fruit Belt." These two major features of the geography of southern Ontario are closely related, and the use of one will affect the use of the other.


MAP 2
HAMILTON
L A K E O N T A R I O
SALTFLEET
NORTH GRIMSBY
CLINTON
LOUTH
ST. CATHARINES
NIAGARA
THOROLD
NIAGARA FALLS
PELHAM
WELLAND
MUNICIPALITIES
LEGEND
TOWNSHIP BOUNDARY
URBAN CORPORATE LIMIT
FORMER TOWNSHIP BOUNDARY
MAJOR HIGHWAYS
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OTHER
ESCARPMENT
NIAGARA ESCARPMENT STUDY
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CHAPTER II

OVERVIEW AND RECOMMENDATIONS

2.1 PROBLEMS AND PROSPECTS

This inquiry into conditions in the Niagara Fruit Belt underscores one of the major dilemmas in the development of this Province. The legend of the Niagara region is widely known. An unparalleled combination of factors have contributed to its growth and well-being. Its location as a hinge between American and Canadian industrial heartlands; Niagara Falls as a spectacle and power; its strategic position in relation to continental transportation routes on land and water; its agreeable climate; the drama of its Escarpment and Lake dominated landscape, and the productivity of its land - all of these conditions working together have shaped the region. The creative response of its people is eloquently documented in statistics on employment, population, economic mix, education levels, and income.[1]

Unfortunately, as the facts in Chapters III to VII of this report indicate, in recent years a new feature has been added to the Niagara legend. The evidence is strong that a set of economic and social forces are gradually but surely upsetting and with accelerated momentum, the agricultural base of the urban-rural complex called the Niagara Fruit Belt. That base has been the valuable horticultural soils - the deep, well-drained, light textured soils, 80 per cent of which are on the plain below the Niagara Escarpment, and 20 per cent in the Fonthill Kame above. Of the

original stocks of some 40,210 acres, over 5,000 acres have been converted to urban development and of the remainder, approximately 11 per cent or 4,000 acres, are within the city limits of St. Catharines and Niagara Falls. The rate of annual loss has increased from 135.5 acres per year from 1934-1954, the period originally documented by Krueger, to 214.5 acres per year in the succeeding period, 1954-1965 (Chapter III).

The foregoing is serious enough. But the Study has looked beyond the direct impact of urban development to the areas of agricultural land that may be indirectly affected - the area of urban shadow. This is the aggregate of all properties (identified as "rurban" in the Report), five acres and over within the Fruit Belt, that by virtue of ownership or occupation of the owner, has a link with urban areas, and is consequently not used for farming with maximum effectiveness or is lying idle. It is an area of latent resource waste. This area in 1967, as documented in Chapter IV, consisted of about 51,600 acres, slightly more than the actual built-up urban area in 1967 - for every acre used to build towns and cities another acre is added to the urban shadow. This ratio is somewhat higher on tender fruit soils, where a direct loss of 5,070 acres compared to a rurban area of 8,685 acres yields a ratio of 1:1.7. The rurban area in total represented in 1967 some 20 per cent of the non-urbanized part of the Fruit Belt (Table 3.2).

When one peers into the future, as this Study has attempted, one sees the possibility on the basis of the long term growth rate of

the region (Table 5.1), of increasing demands for urban land, with its accompanying rurban area, met by increasing demands for agricultural land based on a slight increase in current Ontario per capita consumption of the products of the orchards and vineyards (5.4). The Study estimates that in 1996 urban and rurban land together will account for 82 per cent of the 250,000 acres in the total rural-urban area of the Fruit Belt. The conclusion was accordingly reached that local and provincial policies should give high priority to reducing the area of urban shadow and stimulating new development on less valuable land above the Escarpment.

Current land use and economic facts seem to confirm these trends. While grape acreages have increased 14 per cent since 1951, there is an overall decrease between 1951 and 1965 of 9 per cent in fruit and grape acreages (Table 3.8). The underlying tax pressure continues to rise. Taking 1955 as a base (100), the index of per capita municipal taxation in the three most rural municipalities; the Townships of Niagara, Louth and Clinton, stood at 162 in 1961 and 234 in 1966.

In the face of the situation here described, a certain mood of despair seems to have settled on the region. The study found in its interviews in the area and in its examination of the regional press, the prevailing view that the fruitlands were an essential part of the scene and economy of the area, but they were going and nothing could be done about it. From the farmer, the political leader, the professor, and the researcher came

extravagant prophecies of doom. This "state of mind" is reported here because it is our impression that it has become a tangible factor affecting the development of the area and feeding a downward spiral of decline in standards of resource use and environmental planning.

While, as this report has documented, there is cause for concern, there is also some evidence that the area cannot afford its pessimism, and that there is still a substantial basis for regional renewal. For example, one indication of the viability of an orchard economy is the amount of new planting. In the Niagara District this is still substantial. The 1966 Fruit Tree Census reports that 25 per cent of the peach trees are 1 to 3 years old, and another 31 per cent, 4 to 9 years; and that 46 per cent of sweet cherries and 39 per cent of tart cherries are 1 to 10 years old.[2]

The strong shift to grapes is indicative of the rise of a regional wine industry that has approximately doubled its purchases from Niagara vineyards (from 20,000 to 36,000 tons) within ten years. The region is in an extremely favourable position to capitalize on this rising industry, as the French Hybrid grapes - the Vinifera species on which the improving quality of Canadian wines depend, require the well-drained tender fruit soils; and the exacting climatic requirements of wine grapes - particularly a long frost-free period to allow the build up of brix (sucrose), cannot be met as well anywhere in Canada.[3] The increase in the Vinifera grape - from 280,000 vines and 4.5% of the total in 1956 to 583,000 and 7.1% in 1966, is important economically. The average net income per acre from this species is close to the returns from peaches.4

The extent and scale of orchards and vineyards is shown graphically on the map, Orchards and Vineyards, 1965 (folded map in back pocket). The capitalized value of these 45,187 acres, the value estimated by capitalizing average net income per acre at a rate of 8 per cent, is approximately $25,000,000 (Table 2.1). The Niagara area supports a fruit and vegetable processing industry with an investment of $30,000,000.[5] Tourism, which depends very much in the Niagara region on the attraction of the landscape - "sightseeing" has been given by 83 per cent of American visitors to the area as their major interest, brings about 9 million visitors a year to the Fruit Belt.[6] The general economic growth of the area, which was in the past stimulated by a power cost differential which it no longer enjoys, will increasingly depend in Ontario's "post-industrial society" on its environmental appeal, on the amenities of the natural and man-made landscape.[7] From this point-of-view, the effort that is now being expended on the idea of a Tri-County Scenic Drive along the Niagara Escarpment is sound, but the whole concept will be meaningless if "the scene" - the characteristic landscape of the area, is not preserved. In the future the land, as a factor of production and as the setting for the community, will count more heavily, and not less, in the well-being and prosperity of the area. By writing off the fruitlands we may in fact also undermine the major sources of growth - we may kill the goose that lays the golden eggs.

2.2 RECOMMENDATIONS

The central purpose of this Study has been to inventory present conditions in the Fruit Belt, as a first step towards evolving

a provincial policy for the Fruit Belt. The results reviewed here do not in themselves point to specific and precise solutions. However, they do indicate that a new approach to the area is required. The review of public policies at all levels (Chapter VI) leads to the general judgement that the Fruit Belt suffers from the lack of a coherent concept of its desirable future development in terms of the best overall interests of the Province. As a consequence, both local and provincial agencies are vigorously and, in the main, competently pursuing their single-minded responsibilities without reference to the consequences. In this haphazard way, the pattern of the region is being shaped in default of a total view of its sound development.

In view of this situation, the Study is in agreement with the Niagara Region Local Government Review that the preparation and application of a regional plan is an urgent necessity. Accordingly, the following recommendations are presented:

(1) The Province should assume responsibility for preparing a regional plan for the Fruit Belt, as defined by this Study, within a period of one year from the adoption of this report and that the Advisory Committee give priority to investigating means of implementing this and other Regional Plans.

(2) The terms of reference for the regional plan should include three specific requirements:

  (i) that a maximum amount of the tender fruit soils be preserved for agriculture; and

  (ii) that the planning group explore fully the possibility of establishing or accelerating the growth of existing

urban areas possibly along new development corridors such as that from St. Catharines to Port Colborne; and

(iii) that special attention be given to the economic and social conditions necessary for a viable agricultural economy in the Fruit Belt.

(3) That a professional and suitably diverse and competent task force be formed for the exclusive purpose of preparing the regional plan within the prescribed time-table and that the task force be free to obtain advice from personnel at universities and other sources where there are people with specific knowledge and expertise concerning the diverse conditions and problems of the Fruit Belt.

It is appreciated that the recommended strategy is not specific on two vital points: (i) the administrative responsibility for the preparation of the regional plan; and (ii) the means of implementing the proposed regional plan. These omissions are made in the knowledge that the planning system of the Province is at present under active review, and that in the near future we may expect a resolution of responsibilities as between local, regional and provincial bodies, and between provincial departments; and that the proposals of the Mayo Commission on the boundaries and structure of local government are under active consideration. Ideally, the plan for the Fruit Belt and its implementation can be most effectively dealt with in the framework of these more fundamental decisions; but the nature of the problem is such that, in the absence of an early resolution of the basic issues of planning the government organization, it will be necessary

to invoke extraordinary measures.

TABLE 2.1

ESTIMATED VALUE OF ORCHARDS AND VINEYARDS, 1968[a]

(Based on the Capitalization of Net Income at 8 per cent)
(000's of dollars)

Township	Crop							
	Peaches	Cherries[b]	Grapes	Pears	Plums	Apples	Mixed[c]	Totals
Barton	51	183	71	52	-	10	24	391
Saltfleet	252	899	600	372	150	41	78	2,392
North Grimsby	250	839	410	235	65	16	120	1,935
Clinton	1,094	1,486	974	737	199	28	147	4,665
Louth	1,461	1,246	974	321	108	20	93	4,223
Pelham	455	806	265	395	46	70	105	2,142
Grantham	797	432	614	140	96	8	6	2,093
Thorold	17	67	164	76	3	25	20	372
Stamford	133	67	177	49	13	16	4	459
Niagara	2,382	1,265	1,072	648	246	23	204	5,840
Totals	6,892	7,290	5,321	3,025	926	257	801	24,512

[a]The average net income per acre for the different tree fruits and grapes is: peaches, $62; sour cherries, $97; grapes, $19; pears, $56; and apples, $12. These figures were obtained from cost of production studies done by the Farm Economics, Co-operatives, and Statistics Branch, Ontario Department of Agriculture and Food. The average net income per acre of $125 for sweet cherries and $50 for plums are estimates obtained from the Fruit and Vegetable Extension Service at the Horticultural Research Institute of Ontario, Vineland Station.

[b]The net income for sweet and sour cherries was averaged to $111 per acre.

[c]The net income for cherries, pears, plums, and apples was averaged to $57 per acre.

LIST OF REFERENCES

CHAPTER II

1. Ontario Department of Economics and Development, Niagara 1966, A Report prepared by the Regional Development Branch, Office of the Chief Economist. (Toronto: Ontario Department of Economics and Development, November, 1966).

2. Ontario Department of Agriculture and Food, 1966 Fruit Tree Census: Part II, Tender Fruits, (Toronto: Ontario Department of Agriculture and Food, 1967), pp. 17, 21, 26.

3. William F. Wiley, "Geographical Study of the Winery Establishments in Southern Ontario" (unpublished B.A. Thesis, Department of Geography and Planning, University of Waterloo, 1967), p. 10.

4. Ontario Department of Agriculture and Food, 1966 Fruit Tree Census: Part I, Grapes, pp. 9, 10.

   Ontario Department of Agriculture and Food, Grape Production in the Niagara Peninsula, Production Costs, Returns and Management Practices 1959-1962. A Report prepared by the Farm Economics, Co-operatives, and Statistics Branch. (Toronto: Ontario Department of Agriculture and Food, August, 1968).

5. Estimates provided by Keith Matthie, Secretary-Treasurer, Ontario Tender Fruit Growers' Marketing Board, St. Catharines, Ontario.

6. Ontario Department of Economics and Development, Niagara 1966, p.56
   Tourist figures in the Niagara region are for 1966 and are based on a memorandum from the staff using data from the Niagara Parks Commission and D.B.S.

7. John Friedmann, Regional Development Policy, The M.I.T. Press, 1966, Ch.I and Ch.5, Note Table 1.1.

CHAPTER III

THE PHYSICAL AND CLIMATIC BASE, AND PRESENT LAND USE

3.1 DELINEATION OF TENDER FRUIT AREAS

The Niagara Fruit Belt's unique attributes for tender fruit cultivation are the result of a combination of factors: (i) physical setting, (ii) climate, and (iii) soils. Much has been written about these special features, so that they need be only briefly described here. These physical and climatic factors will be examined in relationship to the requirements for growing "tender fruits," specifically, peaches and sweet cherries. It is in the production of these fruits that the unique attributes of the Fruit Belt are best defined. This is not to minimize the importance of associated fruits such as grapes, pears, plums, sour cherries, and apples. The features that make the Fruit Belt important for the cultivation of tender fruits are also of importance to the production of these other fruits.

3.1.1 The Physical Setting

The Niagara Fruit Belt is located on the north side of the Niagara Peninsula, stretching from Hamilton to the Niagara River. The major physical elements of the Fruit Belt are: (1) the Iroquois Plain (2) the Niagara Escarpment, (3) the Haldimand Plain, and (4) the Fonthill Kame.

(1) The Iroquois Plain forms the major portion of the Fruit Belt. It is a lacustrine plain formed by post glacial Lake Iroquois, and lies between the Niagara Escarpment and Lake Ontario, from Hamilton to the Niagara River.

The plain dips gently to Lake Ontario. The soil materials are clays overlain by sand and occasionally cut by ravines. Some higher benches or terraces are to be found next to the Escarpment, e.g. at Beamsville.

(2) The Niagara Escarpment is the major topographic break in the region rising some 300 feet above the Iroquois Plain. The Escarpment helps create the special climatic conditions necessary to the cultivation of tender fruits, by providing a shelter for the Iroquois Plain and air drainage to fruit growing areas on its brow.

(3) The Haldimand Plain is composed of heavy clays of lacustrine origin. This plain is located above the Escarpment and dips towards Lake Erie. Except for the moraines next to the Escarpment brow where there are suitable soils and good air drainage, the plain is limited to pear and apple orchards.

(4) The Fonthill Kame is an area of sandy loam soils left by glacial action. The light soils and excellent air drainage make this area very important to fruit production.

3.1.2 Climatic Requirements for Tender Fruit Crops

Following is a list of climatic requirements for the production of tender fruits from R.R. Krueger,[1] and comments on how the Niagara Fruit Belt fulfils these requirements.

(1) "Sufficient winter chill to break the rest period; absence of unseasonably warm temperatures during the chill period." The Fruit Belt has sufficient winter chill to break the rest period, and the moderating influence of the Escarpment and Lake Ontario temper any unseasonably warm periods. Grimsby has a mean monthly temperature below $32^{o}F$ for at least three months, December to March.[2]

(2) "Absence of extremely low temperatures." Again the moderating influence of local climatic conditions protects the Fruit Belt from very low temperature conditions. Table 3.1 illustrates that this area has the least chance of killing frosts in Southern Ontario.

(3) "Absence of killing frosts after blossom time." The climatic conditions delay blossoming by moderating sudden warming temperatures until the frost danger is past.

(4) "Sufficient length of growing season to enable fruit to mature." The frost free period is one of the longest in Ontario, see Table 3.2.

(5) "Relatively cool, dry, sunny summer." The monthly mean temperature at Grimsby for June is 64°F; July, 71°F; August, 69°F.[2]

(6) "Freedom from hail and heavy rainstorms when fruit is near or at maturity." The Fruit Belt is relatively more free of these hazards than southern areas in the United States.

(7) "Freedom from high winds at any time of year." The sheltering effect of the Escarpment reduces high winds.

(8) "Annual rainfall of approximately 30 to 40 inches, absence of rain for harvest period." Average annual rainfall at St. Catharines is 27.0 inches; Hamilton, 30.9 inches; Grimsby, 32.2 inches, all relatively evenly distributed throughout the year.[3]

Also local topography plays an important role in terms of air drainage. Good air drainage allows for the avoidance of frost. The air drainage factor is an important benefit of the Fonthill area.

This brief review of the climatic factors of the Fruit Belt in relation to the tender fruit crops indicates that this area is uniquely endowed with a local climate favourable to the production of these crops.

3.1.3 Tender Fruit Soils

Soils suitable for the production of tree fruits should be light in texture, well-drained, and of sufficient depth for proper

TABLE 3.1

ESTIMATED YEARLY ODDS OF LOW TEMPERATURE INJURY TO PEACH TREES IN 30 YEARS (1925-54)

	(-20°F) Tree Damage	(-12°F) Winter Bud Damage	(23-26°F) Spring Bud Damage	Years in 30
Fruit Belt				
St. Catharines	-	2	0.2	2.2
Vineland	-	3	-	3.0
Other				
Harrow, Leamington Chatham, Wallaceburg	-	4	1.2	5.0
Welland	1	6	-	6.0
Goderich	1	5	4.8	9.0
Port Dover	3	8	0.2	9.5
Forest	1	9	4.0	11.8
London	3	13	1.0	13.6
Simcoe	3	14	2.5	15.3

Source: R.M. Irving (ed.), Factors Affecting Land Use in a Selected Area in Southern Ontario, (Toronto: Ontario Department of Agriculture, November 1957), p.11, (after Mercier and Chapman).

rooting, (about two feet). Light sandy soils warm up faster for early spring starts. Also, these soils do not hold excessive amounts of water which causes a delay in hardening off for the winter. The tender fruit soils are listed in Table 3.3 along with their classification as to the soil's natural capability to produce fruit crops. The largest areas of sandy soils are located in the eastern half of the Fruit Belt in Clinton, Niagara, Grantham, Louth, and Pelham Townships. Map 3.1 portrays the location of the tender fruit soils.

MAP 3

NIAGARA ESCARPMENT STUDY

FRUIT BELT REPORT

TABLE 3.2

SELECTED CLIMATIC STATISTICS

Place	Average Frost Free Period[a] (days)
Fruit Belt	
Grimsby[b]	174
Hamilton	170
St. Catharines	169
Other	
Welland	157
Chatham	162

[a] Soil Survey of Lincoln County, p.14.

[b] R.R. Krueger, Changing Land Use Patterns,.., p.64.

TABLE 3.3

TENDER FRUIT SOILS

Name	Rating
Fonthill Loam	Good
Fonthill Sandy Loam	Excellent
Grimsby Sandy Loam	Excellent
Grimsby Fine Sandy Loam	Excellent
Pelham Loam	Good
Pelham Sandy Loam	Excellent
Vineland Sandy Loam	Good
Vineland Fine Sandy Loam	Good
Winona Sandy Loam	Fair
Winona Fine Sandy Loam	Fair
TOTAL	

Source: R.R. Krueger, Changing Land Use Patterns..., p.69

The Niagara Fruit Belt is favoured with the soil types necessary for the production of tender fruit crops.

3.1.4 The Unique Aspects of the Niagara Fruit Belt for Tender Fruit Crops

The climatic and soil advantages of the Fruit Belt for the production of tender fruits such as peaches and sweet cherries are unique to Canada and perhaps to North America. Following are some quotations recognizing this fact:

> "From the information available, it would appear that peach orchards of the Niagara Fruit Belt are safer from low temperature crop losses than any peach district on the continent, outside the Pacific Southwest of the United States.
>
> "In summary, it appears that the Niagara Fruit Belt is indeed well endowed for the fruit growing industry which has developed there. Its climate and soil suitability for tender fruit growing is second to none."
> R.R. Krueger, Changing Land Use Patterns..., p.64 and p.71.
>
> "The favourable climate provided by the lake and the Escarpment to that part of Saltfleet township lying below the Escarpment, has resulted in the extension of the Fruit Belt into this region. The moderate temperature and long frost-free season result in greater yields and reduced risks for the growing of all tree fruits. This is especially true for the more tender fruits such as peaches and sweet cherries, where a unique combination of soil and climate cause the Iroquois Plain to be the most important area in Ontario for these particular crops."
> Soils of Wentworth County, p.20.
>
> "Basically the suitability,'of the Niagara Fruit Belt,' is founded on an ideal combination of soils, climate and water, which cannot be duplicated elsewhere in Canada. Thus the alternative to the loss of this small but very special area lies in the purchasing of future supplies of

certain fruits; particularly peaches, from the U.S.A." Conservation Council of Ontario, A Report on Land Use, Toronto, 1960, p.10.

3.2 PRESENT LAND USE

3.2.1 General Land Uses

The ten townships[4] comprising the Fruit Belt have a total area of 247,340 acres of which some 42,054 acres are in orchard farms, (the major land uses are indicated in Table 3.4). Urban uses occupy some 50,723 acres. An additional 51,619 acres are occupied by rurban uses. Rurban properties are holdings of five acres or more owned by people other than full-time farmers. The large area owned by rurban interests is an indication of the degree of urban intrusion into rural land uses. The "other" land use category includes the Niagara Escarpment, the Welland Canal, and large areas held by the Ontario Hydro Electric Power Commission.

The spatial distribution of these land uses can be seen on the Niagara Escarpment Study, Existing Land Use Maps. These maps were based on interpretation of 1965 aerial photography, and updated to 1966. An examination of these maps reveals the fragmented nature of land use in the Fruit Belt. There are few large contiguous areas devoted to one use. Rather uses grade into each other, from rural to urban. There are residential developments along highways and country roads and at crossroads. Residences become more numerous towards an established urban centre like Hamilton or St. Catharines. However, even within St. Catharines, in what was recently Grantham Township, there is a considerable acreage in orchards

TABLE 3.4

MAJOR LAND USES OF THE NIAGARA FRUIT BELT, 1967[a]

	Acres
Total	247,340
Farm[b]	61,881
(Orchard & Vineyard)	(42,054)
(Other Farm)	(19,827)
Rurban[c]	51,619
Urban	50,723
Other[d]	83,117

a Raw data from assessment cards in local municipal offices.

b Properties managed and occupied by full-time farmers (Table 4.3).

c Properties of five acres or more occupied by other than full-time farmers, (Chapter IV).

d This category includes some farm and rurban properties that were not calculated in Barton Township (now part of Hamilton) and in Pelham Township, south of Sombler Road Concession XI. These two areas were not included because there is very little area devoted to orchards and vineyards.

and vineyards, some 4,371 acres according to a recent survey (Table 3.5). The lack of clear cut demarcation between various uses illustrates: (i) the unguided rural-urban competition for the same land resources, and (ii) the resulting inefficient pattern of development. Such development removes irreplaceable orchard lands and leads to high costs of servicing. A closer examination of this conflict is in order.

TABLE 3.5

VINEYARD AND ORCHARD ACREAGES BY TOWNSHIP, 1965

Township	Crop								
	Peaches	Grapes	Cherries	Pears	Plums	Apples	Apricots	Mixed	Totals
Barton	66	300	132	84	-	65	-	34	681
Saltfleet	325	2,526	648	531	240	275	-	110	4,655
North Grimsby	323	1,725	605	335	104	106	-	168	3,366
Clinton	1,412	4,099	1,071	982	318	189	6	207	8,284
Louth	1,885	4,102	898	458	172	135	8	130	7,788
Pelham	587	1,117	581	564	73	467	-	147	3,536
Grantham	1,029	2,584	311	225	153	51	10	8	4,371
Thorold	22	689	48	108	5	166	-	28	1,066
Stamford	172	746	48	79	20	104	-	6	1,175
Niagara	3,073	4,513	912	926	393	127	35	286	10,265
TOTALS	8,894	22,401	5,254	4,292	1,478	1,685	59	1,124	45,187

Source: Byron E. Beeler, "Niagara District: Tree Fruit and Vine Census, 1965 Aerial Photographs," Ontario Department of Agriculture & Food, Vineland Station, 1966.

3.2.2 Orchards and Vineyards

Evidence shows a surprisingly large amount of land in orchard and vineyard cultivation, some 45,187 acres. This evidence is shown on the Niagara Escarpment Study mapping, Orchards and

Vineyards, 1965, (folded map in back pocket) and in Table 3.5. They both are based on photographic interpretation of 1965 air coverage.[5] The map, Orchards and Vineyards, 1965, shows a very close correlation between the various fruit crops, and soil and the climatic conditions described before. The relationship of tender fruit crops such as peaches to the tender fruit soils (Map 3) is especially close. The second observation is that there are areas of concentration for various crops. Sizeable acreages of peaches exist in Niagara, Louth, Clinton and Grantham Townships (Table 3.5 and folded map in pocket). Grapes are found mainly on non-tender fruit soils below and above the Escarpment. In terms of total acreage under orchard or vineyard cultivation, the ten townships of the Fruit Belt may be ranked as in Table 3.6. The first three, Niagara, Clinton and Louth Townships account for over half the total acreage. Saltfleet and Grantham Townships, ranking 4th and 5th, have surprisingly large acreages when the urban influence in these townships

TABLE 3.6

FRUIT BELT TOWNSHIPS RANKED BY ORCHARD AND VINEYARD ACREAGE, 1965

Rank	Township	Acres	Rank	Township	Acres
1.	Niagara	10,265	6.	Pelham	3,536
2.	Clinton	8,284	7.	North Grimsby	3,366
3.	Louth	7,788	8.	Stamford	1,175
4.	Saltfleet	4,655	9.	Thorold	1,066
5.	Grantham	4,371	10.	Barton	681

is considered. A sizeable acreage of orchards including tender fruits is found near Fonthill. Although urban uses are making serious inroads into areas of orchard and vineyard cultivation, most of the cultivable fruitlands are still in orchards and vineyards. More important, these are concentrated in areas of sufficient size to form core areas for Fruit Belt preservation. This point is clearly portrayed on the Orchards and Vineyards, 1965 map.

3.2.3 Urban Land Uses

An analysis of the Niagara Escarpment Study Existing Land Use Maps, shows that there is some 50,700 acres of land in urban uses in or associated with the Niagara Fruit Belt. The acreages in urban uses are shown for each municipality in Table 3.7. The first four are incorporated cities and naturally include the major portions of urban land uses, some 38,050 acres. Significant areas of orchards and vineyards are found within these city limits, about 4,371 acres in Grantham Township alone. Saltfleet Township, next to Hamilton, contains the most acreage in urban development of the townships. Niagara Township also contains a sizeable urban acreage, 2,439 acres, as well as the largest acreage in orchards and vineyards (10,265 acres). Niagara is a key Township in preserving the fruitlands. However, it appears to be under considerable urban development pressure. In contrast, Clinton and Louth Townships also prominent townships in terms of fruit cultivation, are the least affected by urban development, having some 1,888 acres of urban development between them.

The pattern of urban development is the greatest cause

TABLE 3.7

FRUIT BELT MUNICIPALITIES RANKED BY
DEVELOPED URBAN ACREAGE, 1966

Rank	Municipality	Acres	Rank	Municipality	Acres
1.	Hamilton (includes Barton Twp.)	16,330	7.	Thorold	2,101
2.	St. Catharines (Includes Grantham Twp.)	9,944	8.	North Grimsby	1,727
3.	Niagara Falls (includes Stamford Twp.)	8,329	9.	Pelham	1,599
4.	Welland	3,447	10.	Clinton	985
5.	Saltfleet	2,920	11.	Louth	903
6.	Niagara	2,439			

Source: Niagara Escarpment Study Existing Land Use Maps, and Table 5.2, Chapter V.

for alarm. Urban development appears to be scattered throughout the Fruit Belt. Houses are located along highways and county roads, leaving blocks of agricultural land in the interior of concessions. Development has leapfrogged over some agricultural land leaving them as islands in a sea of urban development. This form of urban development pattern creates heavy demands on a rural municipality's services and fosters a climate of instability, working against the long-range planning and investment required for planting orchards and vineyards.

3.2.4 Tender Fruit Soils

The key element to the survival of the tender fruit industry is the limited area of tender fruit soils. Krueger estimates that

there were some 40,000 acres of tender fruit soils outside built-up urban areas, and not including non-agricultural land uses.[6] Between 1934 and 1965, Krueger has calculated that 5,070 acres[7] have been lost to urban development leaving approximately 35,000 acres of tender fruit soils. If the tender fruit industry is to be viable, it must be on these 35,000 acres. However, continuing urban development, in the present form, can jeopardize the survival of the industry by consuming these irreplaceable soils.

3.3 OBSERVED TRENDS IN LAND USES

Although it has been demonstrated that there is considerable orchard and vineyard acreage in the Niagara Fruit Belt, the present trends in urban development are in conflict with the continuing viability of the fruit growing industry. Considerable study has already been done on this aspect of the Fruit Belt so that a brief summary of these conditions is all that is necessary. For a more in depth treatment of this problem the reader is referred to R.R. Krueger, Recent Land Use Changes in the Niagara Fruit Belt, Appendix B, of this Study.

3.3.1 Trends in Agriculture

Orchard and vineyard acreages have been increasing in the Fruit Belt up to 1958.[8] The increases occurred on land formerly used for general farming or other purposes. These areas included more clay soils put into viticulture and extension of the Fruit Belt to the Vinemount moraine along the brow of the Escarpment. The acreages of the various orchard and vineyard crops

TABLE 3.8

NIAGARA FRUIT BELT 1931-1951-1965
TREE FRUIT AND GRAPE ACREAGES

	1931[a]	1951[a]	1965[b]
Peaches	7,240	13,960	8,894
Grapes	14,560	19,610	22,401
Cherries	1,800	4,050	5,254
Pears	1,910	5,020	4,292
Plums	2,580	4,590	1,478
Apples	4,630	2,210	1,685
Apricots	-	-	59
Mixed	N/A[c]	N/A[c]	1,124
TOTAL	32,720	49,440	45,187

a R.R. Krueger, Recent Land Use Changes in the Niagara Fruit Belt, Appendix B, this study.

b B.E. Beeler, Niagara District Tree Fruit and Vine Census..., 1966.

c Not available since category was not used.

are listed in Table 3.8. Grapes and cherries show an increase in extent. However, there is a marked reduction in peach and plum acreage. The removal of 5,066 acres in peaches is especially significant owing to their close correlation to tender fruit soils. This decrease may be attributable to increased urban development and to the extension of grape cultivation onto tender fruit soils. The new French Hybrid grapes, of value to the wine industry, grow

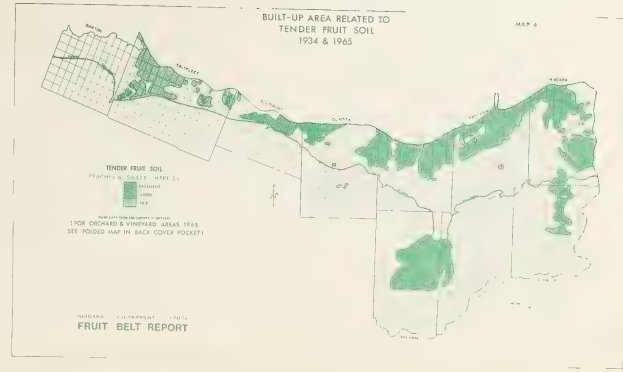
better on these soils. There has been a total decrease in orchard and vineyard acreage of 4,253 acres from 1951 to 1965.

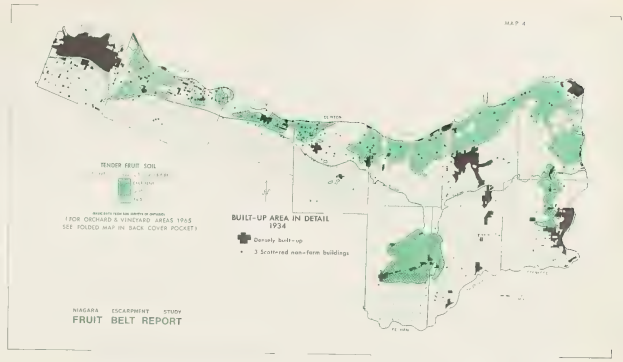
3.3.2 Trends in Urban Development

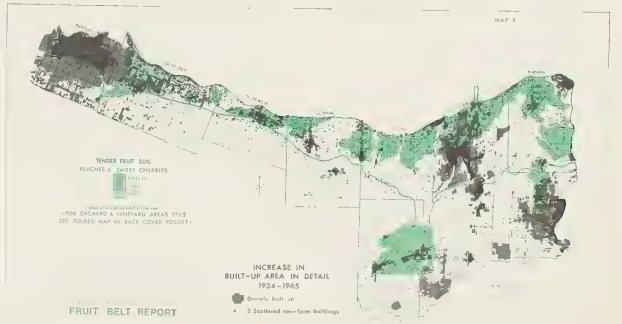
It is well known that urban development is increasing in the Fruit Belt. However, the critical feature is the amount of non-farm development that is locating on the tender fruit soils, the core of the fruit industry. Table 3.9 illustrates the amount of urban expansion onto tender fruit soils since 1934 and gives an indication of the rate of expansion. Expansion of urban uses in the last eleven years is close to the expansion for the twenty years, 1934 to 1954. The rate of development has increased on tender fruit soils. Saltfleet and Grantham show the greatest losses of tender fruit soils as would be expected owing to their location adjacent to Hamilton and St. Catharines respectively. Stamford, now part of Niagara Falls,ranks third, followed by Louth, bordering on an urbanizing area, and North Grimsby Townships. All the rest show less than ten acres per year. These rates of loss to urban development may appear small in certain instances; however, it must be realized that the amount of tender fruitland is finite. Map 4 provides a visual picture of the expansion of urban development between 1934 and 1965 and its relationship to tender fruit soils.[9]

3.3.3 The Hidden Loss

The form and trend of urban development in the Fruit Belt has created pressures on the remaining fruitlands that are not apparent from maps and aerial photographs. An increasing rurban


BUILT-UP AREA RELATED TO
TENDER FRUIT SOIL
1934 & 1965
MAP 4
TENDER FRUIT SOIL
PEACHES & SWEET CHERRIES
(FOR ORCHARD & VINEYARD AREAS 1965
SEE FOLDED MAP IN BACK COVER POCKET)
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT


MAP 4
TENDER FRUIT SOIL
(FOR ORCHARD & VINEYARD AREAS 1965
SEE FOLDED MAP IN BACK COVER POCKET)
BUILT-UP AREA IN DETAIL
1934
Densely built-up
3 Scattered non-farm buildings
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT


MAP 4
TENDER FRUIT SOIL
PEACHES & SWEET CHERRIES
(FOR ORCHARD & VINEYARD AREAS 1965
SEE FOLDED MAP IN BACK COVER POCKET)
INCREASE IN
BUILT-UP AREA IN DETAIL
1934 - 1965
Densely built-up
3 Scattered non-farm buildings
FRUIT BELT REPORT

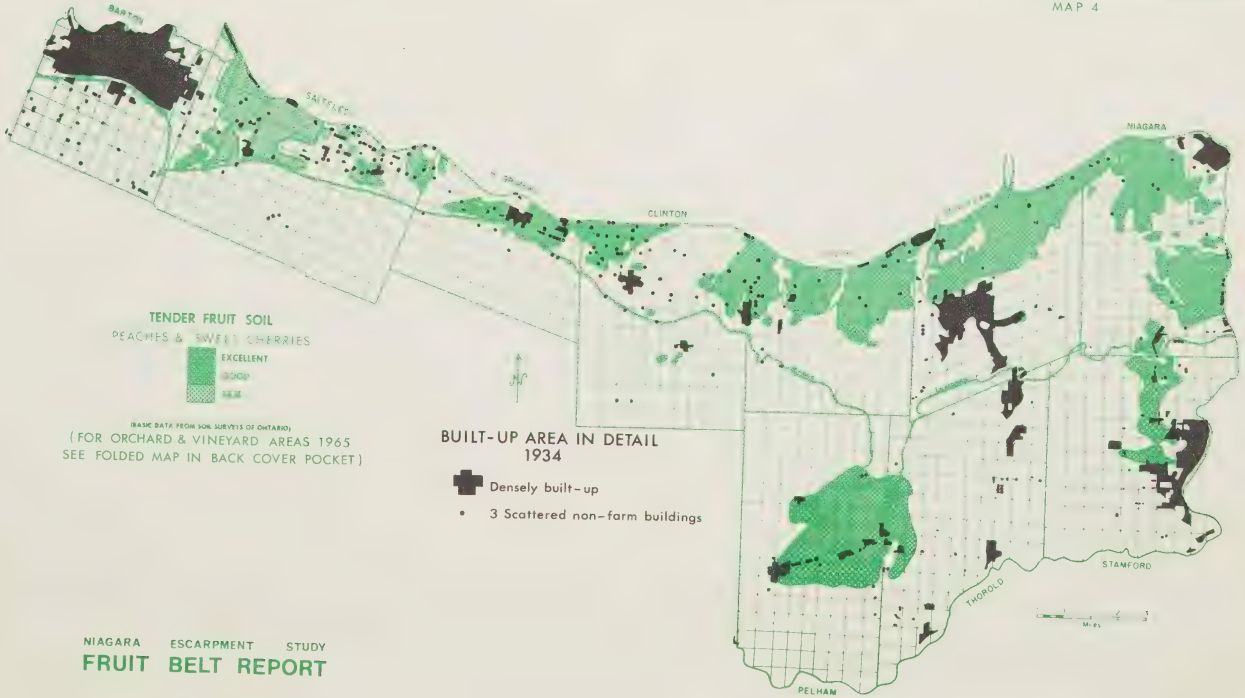

BARTON
SAULTLEY
CLINTON
NIAGARA
STAMFORD
THOROLD
PELHAM
TENDER FRUIT SOIL
PEACHES & SWEET CHERRIES
EXCELLENT
GOOD
FAIR
(BASIC DATA FROM SOIL SURVEYS OF ONTARIO)
(FOR ORCHARD & VINEYARD AREAS 1965
SEE FOLDED MAP IN BACK COVER POCKET)
BUILT-UP AREA IN DETAIL
1934
Densely built-up
3 Scattered non-farm buildings
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT

TABLE 3.9

INCREASE IN URBAN GROWTH ON TENDER FRUIT SOILS[a]
1934-1954-1965
(ACRES)

	1934-1954		1954-1965	
	Increase	Average per Year	Increase	Average per Year
Barton[b]	-	-	-	-
Saltfleet	1,050	52.5	800	72.8
North Grimsby	100	5.0	160	14.5
Clinton	40	2.0	90	8.2
Louth	140	7.0	130	11.8
Grantham	860	43.0	700	63.5
Niagara	140	7.0	100	9.1
Pelham	80	4.0	60	5.5
Thorold	10	0.5	20	1.8
Stamford	290	14.5	300	27.1
TOTALS	2,710	135.5	2,360	214.3

a
R.R. Krueger, Recent Land Use Changes in the Niagara Fruit Belt, Table B.2, Appendix B, this study.

b
Barton does not contain significant areas of tender fruit soils.

population has resulted in higher taxes to cover the need for more services. Land is being divided into units too small for economic farming. Speculation has raised the asking price for land throughout the Fruit Belt to a point beyond that reasonable for even a high

return crop such as peaches. Many farmers viewing the inroads of urban development have caught "subdivision fever." From an interview with Mr. R.J. Martin, Farm Credit Corporation, the maximum value for peach growing land below the Escarpment should be $1,500 to $2,000 per acre, the average price per acre ranges from $5,000 in Saltfleet to $1,650 in Niagara Township (NES data). A social climate has developed that assumes the fruit industry to be dying and expects eventual urbanization of the fruitlands. This leads to more disintegration of land holdings and more speculation. Investment in new orchards and vineyards is curtailed owing to this expectation. Replacement of present trees and vines is limited to the more rural areas.

If the Fruit Belt is to be maintained as a viable industry then a policy of preservation will have to be stated and acted upon. Only in this way can the present social climate be changed. It must be firmly declared that trend is not destiny.

LIST OF REFERENCES

CHAPTER III

1. R.R. Krueger, Changing Land Use Patterns in the Niagara Fruit Belt. Transactions, Royal Canadian Institute, October 1959, p.54.

2. Soils of Wentworth County, Report No.32 of the Ontario Soil Survey (Toronto: Ontario Department of Agriculture, 1965), p.21.

3. Ibid., and Soil Survey of Lincoln County, Report No.34 of the Ontario Soil Survey (Toronto: Ontario Department of Agriculture, 1963), p.14.

4. The original township names and boundaries are referred to as well as the present municipalities resulting from annexation of townships.

5. Byron E. Beeler, "Niagara District Tree Fruit and Vine Census, 1965 Aerial Photography," Report given at the Annual Convention of the Niagara Peninsula Fruit and Vegetable Growers Association, November 30, 1968." Prepared for the Ontario Department of Agriculture and Food by D.K. Erb, University of Waterloo, 1966.

6. R.R. Krueger, p.71.

7. R.R. Krueger, Recent Land Use Changes in the Niagara Fruit Belt, Table B.2, Appendix B, this study.

8. (a) The Niagara Area, Changing Land Uses, Community Planning Branch, Ontario Department of Municipal Affairs, Toronto, July, 1961 (Report does not include Barton and Saltfleet Townships).

   (b) M.H. Sinclair, "The Niagara Peninsula," Resources for Tomorrow Conference, Background Papers, Ottawa, 1961, Volume I, pp.487-503.

9. Over a base map of Tender Fruit Soils, there are two overlays (1) shows the Built-up Area in 1934 and (2) illustrates the change in built-up areas between 1934 and 1965. The two overlays viewed together, indicate the built-up area in 1965.

CHAPTER IV

THE INDIRECT IMPACT OF URBAN DEVELOPMENT ON AGRICULTURAL LANDS

4.1 POPULATION

The population of the Niagara Fruit Belt has increased more rapidly than for the Province as a whole. In 1966, the Fruit Belt had a population of 552,095 compared to 262,868 in 1931 (Table 4.1). This change is an increase of over 110 per cent as compared to the Provincial increase of 103 per cent for the same period. The cities of Hamilton, St. Catharines and Niagara Falls show the greatest numerical increase, some 234,900 people, (Table 4.1). The rural townships show the greatest relative change. Three townships show the following percentage and absolute changes in population: Niagara, 242 per cent - 8,814 people; North Grimsby, 229 per cent - 9,612 people; Saltfleet, 212 per cent - 17,133 people. The major portion of the population increase is urban oriented; however, in terms of impact on fruit farming the increase in population in the rural areas is of greatest concern.

The urban-rural composition of the population is very difficult to determine, owing to annexations by urban areas and to the definitions and changes of definition used by Dominion Bureau of Statistics. For example, the present definition of a farm is an area of one acre or more with an income of fifty dollars or more. Such a definition could include many people who do not make a significant contribution to the fruit farming industry. The ratio of

TABLE 4.1

TOTAL POPULATION IN THE NIAGARA FRUIT BELT
1931 AND 1966[a]

Areas[f]	1931	1966	% Change
Barton[b]	3,295	-	-
Saltfleet	8,094	25,227	212
North Grimsby	4,202	13,814	229
Clinton	4,216	9,701	130
Louth	3,165	5,677	79
St. Catharines[c]	34,187	97,101	184
Niagara	3,649	12,463	242
Pelham[d]	3,548	6,130	73
Thorold[d]	14,901	23,093	55
Niagara Falls[e]	28,056	60,768	117
Hamilton	155,547	298,121	92
TOTAL	262,860	552,095	110

[a] Dominion Bureau of Statistics, Census of Canada: Population, 1931 and 1966.

[b] Barton is now part of Hamilton.

[c] 1931 includes St. Catharines and separate municipalities of Merritton, Port Dalhousie, and Grantham.

[d] The populations of Welland and Fonthill, which overlap township boundaries, were divided between townships based on the work of R.R. Krueger, p. 102.

[e] 1931 includes Niagara Falls and the municipalities of Stamford and Chippawa.

[f] "Areas" include towns and villages not specifically listed.

people owning property in rural areas oriented either to farming or to urban occupations is critical to the assessment of urbanizing tendencies. An in depth study of the ownership of rural land was done to determine this unseen impact of urbanization.

4.2 METHOD OF DETERMINING THE INDIRECT URBAN IMPACT

4.2.1 Purpose and Criteria

In order to assess the urbanization tendencies in the Niagara Fruit Belt, it was decided to do a detailed survey of large properties (Appendix C). All properties assessed at a farm rate and large residential holdings (five acres and over) were studied. From this survey, five types of properties were considered to indicate land having urban tendencies, i.e. land that is not being farmed full-time by the owner. The property types are distinguishable by one or a combination of the following criteria: (i) ownership, (ii) place of residence of the owner; (iii) occupation of the owner; (iv) assessment; (v) size. The five types of properties and their specific characteristics are outlined below:

(1) Residential Holdings

- owner has an urban occupation
- residential assessment
- five acres or more

(2) Urbanite Farms

- land owned by urban interests[1]
- owner is non-resident
- farm assessment

(3) Tenant-Urbanite Farms

- land owned by urban interests
- owner is non-resident

- tenant farmer
- farm assessment

(4) Resident Farms

- owner resides on the land or in the municipality (lives locally)
- owner has an urban occupation
- farm assessment

(5) Part-time Farms

- owner resides on the land
- part-time farmer
- farm assessment

The reasons for selecting these indicators were:

(1) They are invisible, i.e. a person travelling through the area or interpreting air photographs could only speculate on ownership of the land and occupations of the residents.

(2) Visible signs of urbanization such as industrial plants, subdivisions and individual housing units have been mapped and studied, but they do not in themselves reflect the total impact of urban forces on rural land.

(3) The identification of these five types of properties is an attempt to look forward rather than an observation of past development. These property types are changing towards urban uses; hence, they provide a glimpse of the possible future land-use pattern in the "fruitlands."

(4) The ownership of land is very important, particularly to the investment in fruit farming. Fruit farming is a long-term and labour intensive enterprise. It takes newly-planted peach trees five years before they begin to produce and

several more years before they reach maximum bearing capacity. Moreover, an acre of peaches has the equivalent labour requirement of approximately 25 to 35 acres of hay or grain or that of about two milking cows for one year. A tenant farmer will not have the long-term security required to employ sound fruit farming practices. A part-time farmer will not be able to spend the necessary time. The occurrence of these phenomena are often symptoms of disorder or impending change in the agricultural economy.

4.2.2 Rationale

The ownership of land is of prime importance in determining the future trend in fruit farming in the Niagara Fruit Belt. A parcel of land with an industrial plant on it is in urban use: this is evident. A similar parcel of land with fruit trees on it is said to be in rural use but this is not so incontestable.

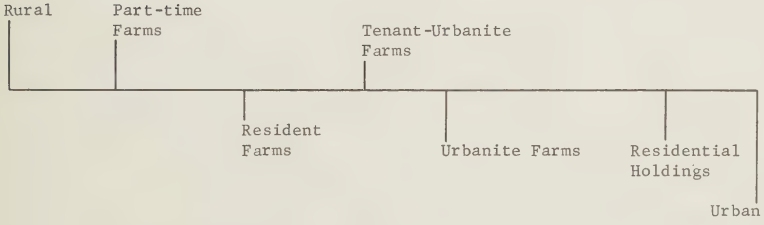
This Study defines rural land as that area which is owned by a farmer who makes his living from the land. Urban land is that area which is owned by urban interests and occupied by an urban use, i.e. commercial establishment, subdivision, etc. Between these two extremes, are parcels of land which exhibit various combinations of features neither all rural nor entirely urban. Their position relative to the two extreme types, rural and urban, depend on the property's particular characteristics.

The following diagram illustrates, schematically, the position

of the five property types. Since these parcels of land are neither urban nor rural but scattered along the rural-urban continuum, they are referred to as rurban properties.

In terms of land actually being farmed, tenant-urbanite farms should be placed closer to part-time farms than resident farms. However, when ownership is considered, this interchange cannot occur. A tenant-urbanite farm is owned by urban interests, hence the tenant-farmer has no long term security of tenure. Without this, there are no incentives for him to invest in the land in order to maintain or increase farm production over a period of time.

RELATIVE POSITION OF RURBAN PROPERTIES ALONG THE RURAL-URBAN CONTINUUM



Rurban properties are not stable but rather are changing in terms of their land use. The rate and direction of land use changes varies with urban-induced pressures.

This characteristic of changing use makes rurban properties very pertinent to the preservation of the Niagara Fruit Belt. The use

of land for subdivision or an industrial plant is relatively stable. By contrast, the use or rurban properties is uncertain, and this volatility makes them sensitive indicators of tomorrow's land use patterns.

4.3 AMOUNT OF LAND OCCUPIED BY RURBAN PROPERTIES

4.3.1 Composite View

The five types of properties - residential holdings, urbanite farms, tenant-urbanite farms, resident farms and part-time farms - occupy 51,620 acres[2] in the Niagara Fruit Belt. This figure is a combined total of 2,319 properties having an average size of 22.3 acres. Table 4.2 illustrates the distribution of acreage and properties amongst the five classifications. This may be compared to Table 4.3

TABLE 4.2

DISTRIBUTION OF ACREAGE ACCORDING TO PROPERTY TYPE

Property Type	Total Acres	Percent of Total acres	No.of Properties	Average Size (acres)
Residential Holdings	2,734.7	5.3	252	10.9
Urbanite Farms	20,887.4	40.5	766	27.3
Tenant-Urbanite Farms	3,262.0	6.3	76	42.9
Resident Farms	17,007.0	32.9	909	18.7
Part-time Farms	7,728.8	15.0	316	24.5
TOTAL	51,619.0	100.0	2,319	22.3

Source: Raw data from assessment cards in local Municipal Offices.

TABLE 4.3

NUMBER, AREA AND AVERAGE SIZE OF ALL TYPES OF FULL-TIME FARMS, NIAGARA FRUIT BELT, 1967[a]

	TOTAL	Saltfleet	North Grimsby	Clinton	Louth	St. Catharines	Niagara	Pelham	Thorold	Niagara Falls	Welland
General Farms[b]											
Number	377	35	45	62	15	5	65	80	36	30	4
Acreage (Ac.)	19,826.6	2,296.4	2,249.9	4,848.8	563.2	54.9	1,127.2	4,787.8	1,926.8	1,812.4	159.2
Average Size (Ac.)	52.6	65.6	50.0	78.2	37.5	11.0	17.3	59.8	53.5	60.4	39.8
Mixed Orchard and Vineyard Farms											
Number	532	92	57	160	84	6	97	24	5	7	-
Acreage (Ac.)	18,138.7	3,035.1	2,045.8	4,117.0	3,618.5	147.6	3,512.8	1,029.3	287.8	344.8	-
Average Size (Ac.)	34.1	33.0	35.9	25.7	43.1	24.6	36.2	42.9	57.6	49.3	-
Orchard Farms											
Number	479	-[c]	50	103	109	18	147	44	4	2	2
Acreage (Ac.)	9,317.5	-	779.7	1,693.7	1,930.5	274.6	2,905.1	1,565.6	99.6	35.8	32.9
Average Size (Ac.)	19.5	-	15.6	16.4	17.7	15.3	19.8	35.6	24.9	17.9	16.5
Vineyard Farms											
Number	277	12	31	40	68	12	66	21	13	14	-
Acreage (Ac.)	14,598.4	709.9	1,319.8	1,721.7	3,453.3	306.7	3,271.7	1,576.3	1,138.4	1,100.6	-
Average Size (Ac.)	52.7	59.2	42.6	43.0	50.8	25.6	49.6	75.1	87.6	78.6	-
TOTAL FARMS											
Number	1,665	139	183	365	276	41	375	169	58	53	6
Acreage (Ac.)	61,881.4	6,041.4	6,395.2	12,381.2	9,565.5	783.8	10,816.8	8,959.0	3,452.6	3,293.6	192.1
Average Size (Ac.)	37.2	43.5	34.9	33.9	34.7	19.1	28.8	53.0	59.5	62.1	32.0

[a] Raw data from assessment cards in local Municipal Offices.

[b] General farms are all those farms with one acre or less of orchard and/or vineyard.

[c] Orchard farms are included with mixed orchard and vineyard farms because of the local designation in the Assessment Office.

on full-time farms. Full-time farms occupy 61,881 acres in 1,665 properties with an average size of 37.2 acres.

It should be noted that urban interests are the most significant with over 24,000 acres in tenant-urbanite and urbanite farms. Moreover, the three property types which, by definition, are farthest removed from being actual farms; i.e. residential holdings, urbanite and resident farms; account for 78.7 per cent (40,629 acres) of the total acreage.

4.3.2 Urbanization Tendencies on Tender Fruit Soil

Since the prime areas for the cultivation of fruit in the Niagara Peninsula are on the tender fruit soils, an estimate of the amount of this land being held by urban-oriented interests is of concern. Table 4.4 shows that some 8,700 acres of tender fruit soil are occupied by rurban properties. This could reduce the 35,000 acres still available for fruit production to 26,300 acres.

There is, however, one redeeming feature. The 8,700 acres, although tending towards an urban land use, have not, as yet, been consumed. Hence, a large portion of this land could be held as a fruit growing area. This is particularly true of the last two categories, resident and part-time farms, which comprise a total of 4,850 acres. These parcels of land are fairly large averaging over 13 acres per unit, and are farmed to some extent. Also, they are usually located further from the urban centres than are the other three categories. Residential holdings are the least likely to revert to fruit growing since they are relatively small, averaging 6.8 acres,

and are generally not farmed.[3]

TABLE 4.4

RELATIONSHIP BETWEEN PROPERTY TYPES AND TENDER FRUIT SOIL

Property Type	Tender Fruit Soil (acres)	Number of Properties	Average Size (acres)
Residential Holdings	528.8	78	6.8
Urbanite Frams	2,452.0	139	17.6
Tenant Urbanite Farms	853.4	26	32.8
Resident Farms	3,414.7	264	12.9
Part-time Farms	1,436.8	104	13.8
TOTAL	8,685.7	611	14.2

Source: Raw data from assessment cards in local Municipal Offices

Urbanite and tenant-urbanite farms are biased away from "rural land" status because the majority of these parcels of land are situated adjacent to urban centres; many parcels were purchased at higher values per acre than their agricultural value and hence are priced too high for the local farmer to repurchase; there may have been a tendency on the part of the owner and/or tenant to "mine" the land of its agricultural productivity which adds to the cost of reclaiming this land for farming purposes.

4.3.3 Urbanization Tendencies on non-Tender Fruit Soil

The amount of land changing to urban uses on non-tender

fruit soil is nearly 43,000 acres or 83.5 per cent of the total (Table 4.2). Contrasted with Table 4.4 the larger individual unit is notable. The average size of 25 acres, is nine acres larger than its tender fruit soil equivalent. Part-time and resident farms along with residential holdings are almost twice the size. Nearly 70 per cent of the 42,934 acres are located south of the Niagara Escarpment. The average size of a parcel of land south of the Escarpment is 31.3 acres compared to 17.3 acres below (north) the Escarpment. On top of the Escarpment, land is less expensive, making it possible to purchase larger acreages. The average price per acre of land south of the Escarpment ranges from $550 to $1,830. North of the Escarpment the price of land varies from $1,650 to $5,000.

TABLE 4.5

RELATIONSHIP BETWEEN PROPERTY TYPES AND NON-TENDER FRUIT SOIL

Property Type	Non-Tender Fruit Soil (acres)	Number of Properties	Average Size (acres)
Residential Holdings	2,205.9	174	12.7
Urbanite Farms	18,435.4	627	29.4
Tenant Urbanite Farms	2,408.6	50	48.2
Resident Farms	13,592.3	645	21.1
Part-time Farms	6,292.0	212	29.7
TOTAL	42,934.2	1,708	25.1

Source: Raw data from assessment cards in local Municipal Offices.

4.4 LOCATIONAL ASPECTS OF RURBAN PROPERTIES

An examination of Table 4.6 shows that two-thirds of the rurban acreage is located in Saltfleet, Pelham, Niagara and Thorold Townships. The location of these properties reflect the urban pressures from nearby cities, such as Hamilton and St. Catharines.

TABLE 4.6

TOTAL ACREAGE AND AVERAGE SIZE OF ALL RURBAN PROPERTIES BY MUNICIPALITY[a]

Municipality	All property types (acres)	Percent of Total	No.of Properties	Average Size (acres)
Saltfleet Township	9,072.9	17.6	397	22.9
North Grimsby Township	2,577.0	5.0	118	21.8
Clinton Township[b]	5,628.4	10.9	273	20.6
Louth Township	2,666.3	5.2	150	17.8
St. Catharines	1,564.5	3.0	90	17.4
Niagara Township	8,710.4	16.9	530	16.4
Pelham Township[c]	9,045.9	17.5	383	23.6
Thorold Township	7,523.7	14.6	238	31.6
City of Welland	464.1	0.9	15	30.9
Niagara Falls	4,366.7	8.5	125	34.9
TOTAL	51,619.9	100.0	2,319	22.3

[a] Raw data from assessment cards in local Municipal Offices

[b] The 16 properties covering 265 acres in the Town of Beamsville have been combined with the figures for Clinton Township

[c] The three properties covering 33.6 acres in the Village of Fonthill have been combined with the figures for Pelham Township.

The incidence of the indirect impact, 60 per cent of rurban acreage, falls with particular weight on the tender fruit soil in Niagara and Pelham Townships, (Table 4.7).

TABLE 4.7

RELATIONSHIP BETWEEN RURBAN PROPERTIES AND TENDER FRUIT SOIL BY MUNICIPALITY[a]

Municipality	All rurban Property types (acres)	Percent of Total	No.of Properties	Average Size (acres)
Saltfleet Township	378.9	4.4	30	12.6
North Grimsby Township	177.6	2.0	21	8.5
Clinton Township[b]	482.1	5.6	43	11.2
Louth Township	924.4	10.6	65	14.2
St. Catharines	563.5	6.5	44	12.8
Niagara Township	2,643.8	30.4	214	12.4
Pelham Township[c]	2,639.1	30.4	154	17.1
Thorold Township	759.2	8.7	31	24.5
City of Welland	-	-	-	-
Niagara Falls	117.1	1.3	9	13.0
TOTAL	8,685.7	100.0	611	14.2

a Raw data from assessment cards in local Municipal Offices.

b The five properties covering 80.63 acres in the Town of Beamsville have been combined with the figures from Clinton Township.

c The three properties covering 33.6 acres in the village of Fonthill have been combined with the figures for Pelham Township.

This is a disturbing symptom because any effort to salvage the Fruit Belt would depend on maintaining the agricultural integrity of those few townships like Niagara, Pelham and Louth that still have substantial undisturbed areas of orchards and vineyards (Table 3.5).

The accompanying map Rurban Properties, 1967 shows the scattered nature of these rurban properties. Niagara and Pelham Townships are particularly subject to this kind of land use fragmentation. In the Townships of North Grimsby and Clinton, the rurban development is located more strongly on the Iroquois Plan than above the Escarpment.

4.5 SUMMARY AND CONCLUSIONS

Following is a synopsis of the major findings of this Chapter:

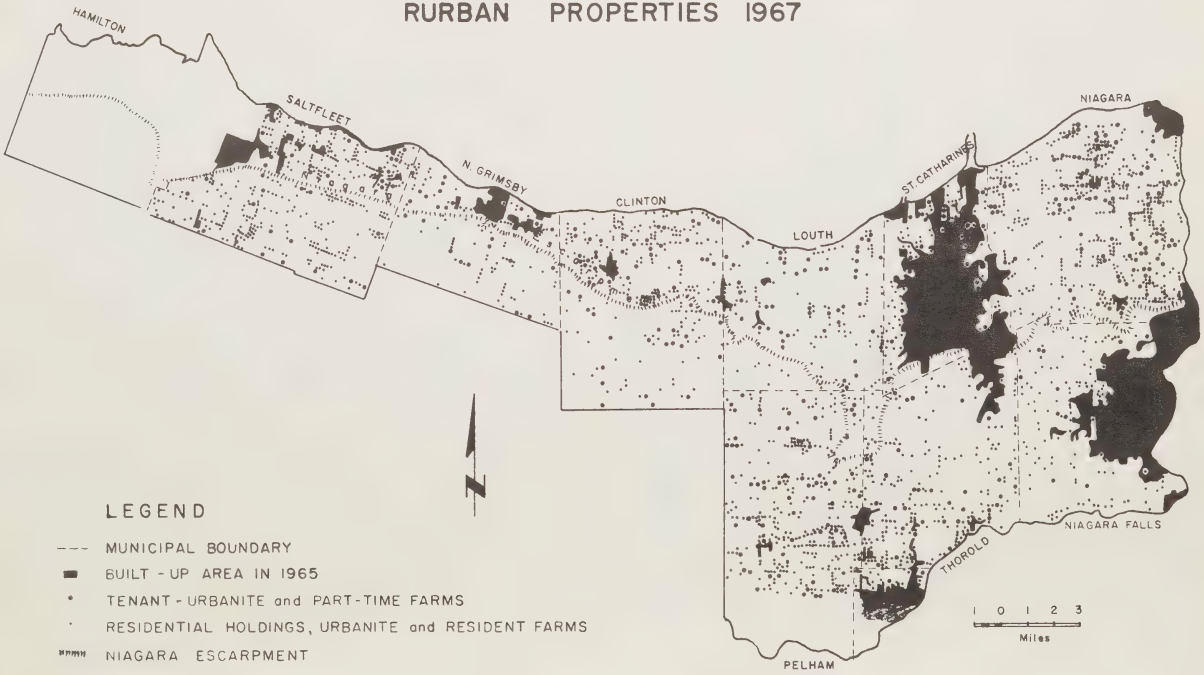
(1) Population in the Niagara Fruit Belt in the past thirty-five years (1931-1966) has increased at a rate (110%) which is higher than the Provincial rate (103%).

(2) Urban population has proceeded at a rate which is higher than the general increase in the regional population. This is indicated by the increase in population within the present boundaries of Niagara Falls and St. Catharines - by 154% and the high rates of increase in Townships abutting the major urban centres (Table 4.1).

(3) There are 2,319 properties in the Fruit Belt occupying 51,620 acres and having an average size of 22.3 acres that can neither be classified as full-time farms nor urban lands, but are scattered on the continuum between the two extremes. These are termed "rurban" properties.

THE NIAGARA FRUIT BELT

RURBAN PROPERTIES 1967



(4) Urban interests own over 24,000 acres of the total rurban acreage of 51,620.

(5) The property types farthest removed from being actual farms - i.e. residential holdings, urbanite and resident farms - account for 78.7 per cent of the total rurban acreage.

(6) Nearly 8,700 acres of tender fruit soil are in rurban properties of which 3,300 acres are owned by urban interests.

(7) About 26,300 acres of tender fruit soil are left for fruit growing as a full-time occupation out of an original total of about 40,000 acres.

(8) Saltfleet, Niagara, Pelham and Thorold Townships contain 66.6 per cent of the rurban properties.

(9) Clinton, Louth and North Grimsby Townships, in descending order of acreage, having been least infiltrated by these types of properties.

(10) Niagara and Pelham Townships contain 60 per cent of the tender fruit soil occupied by rurban properties.

The scatteration of rurban properties (Map 5, Rurban Properties, 1967), poses a serious threat to the continuation of farming. Fruit farming is not a "fly-by-night" endeavour but requires the long term investment of large sums of capital. "Rurbanization" can lead to deterioration in the quality of fruit farming because the owner has neither the time nor the interest to properly farm

his land. If his neglected orchards or vineyards become diseased they may have a detrimental effect upon the surrounding fruitlands. Moreover, the higher prices paid by urban interests for land tends to drive the price of land beyond an economic level for fruit production. Farmers, interested in enlarging their farms, are severely handicapped.

These economic effects of the indirect impact of cities on farmland, what has been called the "urban shadow," operate in a way that will make a reversal in the present land use trends particularly difficult. And yet it is precisely in the area defined by the shadow where, a policy directed at arresting the loss of good farmland would have to devote its attention.

LIST OF REFERENCES

CHAPTER IV

1. Urban interests are those people who are not farmers or other local users of land. These people do not live on their land, but rather in urban centres. However, the property may be occupied by an urban worker and the land rented out to a farmer.

2. This figure includes land in the City of Welland north of the Welland River and all properties fronting on or north of Sombler Road in Concession XI, Pelham Township. The most southern portion of Pelham was not included in this study because there is very little land devoted to orchards or vineyards.

3. Residential assessment is a good indicator of land that has ceased to be used for farming purposes since the local assessors are reluctant to assess large parcels of land at a residential rate unless they are sure that all farming activities have been curtailed.

CHAPTER V

DEMAND FOR LAND 1966 TO 1996

By 1996, according to the Study estimates, the population of the Niagara Fruit Belt will nearly double. An addition of more than half a million people will create a demand for substantial increases in urban land uses. This prospect raises two critical questions: (i) how much land will be required? and (ii) where in the Fruit Belt will future land requirements be allocated? The main purpose of this chapter is to explore the former, that is, "How much land will be required?" and to indicate the general statistical allocation of land on a municipality basis. The "Trends Plan" presented in Chapter VI indicates a likely spatial allocation of the estimated 1996 land needs.

In order to assess future land requirements in the Fruit Belt area, 1996 population estimates were prepared. These are presented in Section 5.1. The 1966 to 1996 population growth increments were then adopted as projection factors to determine future land requirements for urban land use expansion, and orchard and vineyard expansion. Future urban land requirements are dealt with in Sections 5.2 and 5.3. This is followed by an analysis of future orchard and vineyard requirements in Section 5.4.

5.1. POPULATION ESTIMATES

5.1.1 Approach

The preparation of population estimates involved a review of all literature pertaining to growth at a municipal, regional and

provincial level. This initial step was followed by comparing the change in population for the municipalities[1] in the Niagara Fruit Belt, the Niagara Economic Region and Ontario for the period 1931 to 1966. Having established past growth characteristics and future prospects for the area based on studies by Provincial departments, official plans and contact with local officials, it was possible to develop long range population estimates for the goal year of 1996. The year 1996 was selected as a target date to give an end-of-century view of the population/land relationship (Table 5.1).

5.1.2 Results

(a) Overview

Between 1931 and 1966 the population in the Niagara Fruit Belt increased by 325,000 and rose from 65.4 percent of the total population in the Niagara Economic Region to 70.0 percent. In relationship to Provincial growth, the Niagara Fruit Belt encompassed 7.7 percent of Ontario's population in 1931 rising to a high of 8.3 percent in 1951 and levelling out at 8.2 percent in 1966.

On the assumption of the continuation of the established trend,by 1996 73.2 percent of the Niagara Region's population will be located in the Niagara Fruit Belt. As for the Niagara Region, its percentage of the Provincial total is expected to remain at 12 percent over the forecast years. By 1996 the population will be over 1.5 million, an increase of 86 percent over the 1966 total.

(b) Distribution by Municipality

With an estimated 1.1 million people living in the area

TABLE 5.1

POPULATION GROWTH IN THE NIAGARA FRUIT BELT
1966 - 1996
(Population in Thousands)

	1966[a]	1976	1986	1996	Numerical Change 1966-1996
TOWNSHIPS					
Niagara	12.5	16.9	23.3	31.3	18.8
Louth	5.7	7.5	10.0	13.0	7.3
Clinton	9.7	12.6	16.9	22.0	12.3
North Grimsby	13.8	20.9	31.5	45.6	31.8
Saltfleet	25.2	37.2	55.3	78.4	53.2
Thorold	17.0	21.1	26.8	32.8	15.8
Pelham	8.1	10.2	13.3	16.7	8.6
Subtotal	92.0	126.4	177.1	239.8	147.8
% of N.F.B.	(15.7)	(17.4)	(19.2)	(21.0)	(26.6)
CITIES					
Niagara Falls[b]	60.8	72.1	87.6	103.8	43.0
St. Catharines	97.1	121.5	155.2	193.2	96.1
Welland	40.0	50.2	64.6	81.1	41.1
Hamilton	298.1	357.7	439.8	526.6	228.5
Subtotal	496.0	601.5	747.2	904.7	408.7
% of N.F.B.	(84.3)	(82.6)	(80.8)	(79.0)	(73.4)
TOTAL					
N.F.B.	588.0	727.9	924.3	1,144.5	556.5
% of Niagara Region	(70.0)	(71.1)	(72.1)	(73.2)	(76.9)
Niagara Region	840.2	1,024.3	1,281.8	1,563.8	723.6
% of Ontario	(12.1)	(12.1)	(12.0)	(12.0)	(11.9)
Ontario	6,960.9	8,465.2	10,681.9	13,031.9	6,071.0

[a]Dominion Bureau of Statistics, Census of Canada, 1966.

[b]The Niagara Falls total includes the Village of Chippawa.

by 1996 compared to 588 thousand in 1966, the majority of local municipalities can expect to double their present population. The four cities will continue to contain a large portion of the total population with 904,700 for the target year, a 408,700 increase from 1966. Hamilton's[2] growth alone will account for over half of the increase.

In spite of this large additional population, the proportion of the population in the major urban centres to the total for the Niagara Fruit Belt will decline from 84 percent in 1966 to 79 percent for 1996. This illuminates a general trend occurring in the area with a greater number of people choosing to reside outside the formal city boundaries. From 1931 to 1966, the population for the townships increased from 13.9 percent of the total to 15.7 percent, an absolute change of 55,479. With the provision of more services, the townships are expected to gain an increasingly larger proportion so that by 1996, 21 percent or 239,800 people will live in the townships - in the new suburban and exurban areas.

5.2 DEMAND FOR URBAN LAND

In order to determine future land requirements in the Fruit Belt estimates of 1996 space demands were prepared for urban land. Urban land requirements were aggregated into residential, industrial, commercial, recreational, and transportation and utility land use categories.

5.2.1 Existing Density Approach

Urban land needs were estimated by the existing density method. This involved the estimation of future urban land require-

ments on the basis of a number of guiding assumptions and two prediction factors: (i) population estimates for 1996, and (ii) 1966 land use densities.

Under the existing density approach, the 1966 land use densities for industrial, commercial, residential and recreational land use were calculated for each municipality. The land use densities were assumed to remain constant over the projection period and were adopted as projection factors. The population growth estimates developed in Section 5.1 were also adopted as projection factors. These in turn were applied to the 1966 urban land use density factors for the purpose of predicting future land requirements.

Assumptions: The prediction of future urban land requirements under the existing density approach was governed by a number of guiding assumptions. The major assumptions[3] were as follows:

(1) The principal priming elements, e.g. QEW, Welland Ship Canal, which have structured past urban growth will continue to influence future urban development.

(2) Existing urban land use densities for each municipality reflect past trends and are indicators of future land requirements.

(3) Long-range municipal plans will continue to guide development within each municipality and the prevailing pattern of provincial and federal government policies will continue.

1966 Land Use Densities: Land use densities were established for each municipality by determining the ratio of the number of persons per acre of 1966 industrial, commercial, residential and recreational land use. Land use densities for 1966 are outlined in Table 5.2.

Difficulty in making measurements from the land use maps, the lack of uniformity in municipal land use classifications, and incomplete data sources prevented the compilation of 1966 acreages and densities for transportation and utility land use. This necessitated the development of a suitable general standard. After reviewing available information on transportation and utility density ratios in the Study Area[4] and density factors compiled elsewhere,[5] a constant of 10 per cent of the total urban built-up area was developed as a projection factor. This 10 per cent projection factor was then used to determine the 1966 land use acreages and density ratios shown in Table 5.2 and the future transportation and utility land use requirements presented in Tables 5.2, 5.3 and the Table in Appendix D. It is important to note that the 10 per cent factor does not include: those roads that are part of the gross residential land use category; and major regional utilities such as the DeCew Falls - Gibson's Lake hydro development complex in St. Catharines and Thorold Township.

5.3 SUMMARY OF URBAN LAND REQUIREMENTS 1966-1996 ACCORDING TO MAJOR LAND USE CATEGORIES

5.3.1 Residential Expansion

Gross residential densities[6] (1966) for each municipality were assumed to remain constant over the projection period and were adopted as projection factors for new residential development. As illustrated in Table 5.2, the 1966 residential density factors range from 34 persons per acre of residential land in Hamilton, to 9 persons per acre in Niagara Township. The four cities have an average residential density of 21.5 persons per acre. In contrast, the

TABLE 5.2

MUNICIPAL LAND USE ACREAGES AND
DENSITIES BY MAJOR LAND USE CATEGORY

	Land Use 1966 (acres)	1966 Density Persons per acre	Land Use 1996 (acres)	1966-1996 Acreage Increment
TOWNSHIPS				
Niagara				
Industrial[a]	100	125	250	150
Commercial	126	99	316	190
Residential[b]	1,350	9	3,392	2,042
Recreational[c]	618	20	1,553	935
Transportation and utilities[d]	245	-	614	369
	2,439		6,125	3,686
Louth				
Industrial	20	284	45	25
Commercial	90	63	206	116
Residential	458	12	1,048	590
Recreational	245	23	561	316
Transportation and utilities	90	-	206	116
	903		2,066	1,163
Clinton				
Industrial	37	262	84	47
Commercial	73	133	165	92
Residential	576	17	1,306	730
Recreational	201	48	455	254
Transportation and utilities	98	-	223	125
	985		2,233	1,248
North Grimsby				
Industrial	43	321	142	99
Commercial	125	110	411	286
Residential	1,073	13	3,546	2,473
Recreational	313	44	1,035	722
Transportation and utilities	173	-	571	398
	1,727		5,705	3,978

TABLE 5.2 Cont'd.

	Land Use 1966 (acres)	1966 Density Persons per acre	Land Use 1996 (acres)	1966-1996 Acreage Increment
Saltfleet				
Industrial	134	188	415	281
Commercial	405	62	1,262	857
Residential	1,954	13	6,075	4,121
Recreational	135	187	423	288
Transportation and utilities	292	-	908	616
	2,920		9,083	6,163
Thorold				
Industrial	450	38	868	418
Commercial	140	121	271	131
Residential	1,076	16	2,085	1,009
Recreational	225	75	437	212
Transportation and utilities	210	-	407	197
	2,101		4,068	1,967
Pelham				
Industrial	15	537	30	15
Commercial	77	105	159	82
Residential	702	12	1,458	756
Recreational	645	13	1,341	696
Transportation and utilities	160	-	332	172
	1,599		3,320	1,721
CITIES				
Niagara Falls[e]				
Industrial	1,270	48	2,166	896
Commercial	460	32	786	326
Residential	4,675	13	7,983	3,308
Recreational	1,091		1,868	777
Transportation and utilities	833	-	1,423	590
	8,329		14,226	5,897
St.Catharines[f]				
Industrial	1,220	80	2,421	1,201
Commercial	720	135	1,432	712
Residential	6,260	16	12,459	6,199
Recreational	750	129	1,495	745
Transportation and utilities	994	-	1,978	984
	9,944		19,785	9,841

TABLE 5.2 Cont'd.

	Land Use 1966 (acres)	1966 Density Persons per acre	Land Use 1996 (acres)	1966-1996 Acreage Increment
Welland[g]				
Industrial	920	43	1,877	957
Commercial	150	266	304	154
Residential	1,750	23	3,539	1,789
Recreational	282	142	572	290
Transportation and utilities	345	-	699	354
	3,447		6,991	3,544
Hamilton[h]				
Industrial	2,862	104	5,056	2,194
Commercial	805	370	1,422	617
Residential	8,675	34	15,395	6,720
Recreational	2,355	127	4,160	1,805
Transportation and utilities	1,633	-	2,893	1,260
	16,330		28,926	12,596

[a] Gross industrial acreage - includes total acreage occupied by an industrial facility, i.e. service streets, parking and landscaping.

[b] Gross residential consists of the total area occupied by residential land including roads, parking, schools, churches and other institutional land uses. It does not include private or public recreational open space or commercial land use.

[c] Includes both private and public recreation land.

[d] Ten per cent of built-up area.

[e] Based on land use figures from Niagara Escarpment Scenic Drive, Volume I, 1968.

[f] Based on land use figures from draft Official Plan.

[g] Based on land use figures from Welland Area Planning Board.

[h] Estimates from 1961 land use totals taken from Niagara Region Economic Survey, 1963.

townships reveal an average residential density of 13.1 persons per acre.

This residential density range between the townships and the cities clearly illustrates the fact that residential densities are typically being affected by two opposite working trends which tend to counteract each other. On the one hand, higher density housing types are making up an increasing share of the housing stock.[7] This trend is already in evidence and will become more pronounced in the Study Area as urban centres grow beyond the apartment threshold point; that is, the population size at which apartments begin to enter the housing stock. On the other hand, non-contiguous or scattered residential development in the townships, reinforced in many cases by permissive planning policy, will likely influence residential densities in the townships.[8] This will tend to offset, in terms of total residential land needs, the overall impact of the trend towards higher density residential development in the urban centres.

The 1996 population estimates from Section 5.1 were applied as projection factors to the 1966 residential densities. Tables 5.2 and 5.3 summarize residential expansion under the guiding assumptions of the existing density approach. Some of the features of residential expansion that emerge are:

(1) The residential component constitutes 57% of the total 1966-1996 urban land requirements.

(2) There is a 104% increase in total residential acreage - for the Study Area - from 28,549 acres in 1966 to 58,217 acres in 1996 - an absolute increase of 29,737 acres.

(3) The four cities account for 61% of the 1966-1996 expansion in residential acreage.

TABLE 5.3

URBAN LAND REQUIREMENTS BY MUNICIPALITY
BASIS: 1966 LAND USE DENSITIES
(1966 TO 1996)

	Industrial[a]	Commercial	Residential[b]	Recreational[c]	TOTAL[d]
TOWNSHIPS					
Niagara	150	190	2,042	935	3,686
Louth	25	116	590	316	1,163
Clinton	47	92	730	254	1,248
North Grimsby	99	286	2,473	722	3,978
Saltfleet	281	857	4,121	288	6,163
Thorold	418	131	1,009	212	1,967
Pelham	15	82	756	696	1,721
CITIES					
Niagara Falls[e]	896	326	3,308	777	5,897
St.Catharines[f]	1,201	712	6,199	745	9,841
Welland[g]	957	154	1,789	290	3,544
Hamilton[h]	2,194	617	6,720	1,805	12,596
NIAGARA FRUIT BELT	6,283	3,563	29,737	7,040	51,804

[a] Gross industrial acreage - includes total acreage occupied by an industrial facility, i.e. service streets, parking and landscaping.

[b] Gross residential consists of the total area occupied by residential land including roads, parking, schools, churches and other institutional land uses. It does not include private or public recreational open space or commercial land use.

[c] Includes both private and public recreation land.

[d] Total figures include 10 per cent of total built-up area for transportation and utility land use.

[e] Based on land use figures from Niagara Escarpment Scenic Drive, Volume I, 1968.

[f] Based on land use figures from draft Official Plan.

[g] Based on land use figures from Welland Area Planning Board.

[h] Estimates from 1961 land use totals taken from Niagara Region Economic Survey, 1963.

(4) The townships receive 39% of the net 1966-1996 residential increase while accounting for only 21% of the 1966-1996 estimated population growth.

(5) The combined residential expansion for the townships of Saltfleet and North Grimsby accounts for 55% of the total residential expansion in the seven townships, 1966-1996.

5.3.2 Industrial Expansion

The 1966 ratio of population per gross acre of industrial land[9] was calculated for each municipality and then applied as a constant to the population growth estimates. The adoption of existing industrial densities as projection factors was based on the assumption that the increased space requirements for parking, expansion and one level operation would at least in part be offset by a relative decline in industrial employment as a per cent of total population.[10] Existing industrial densities show a high degree of variance - ranging from 537 persons per acre of industrial land in Pelham Township to 38 persons per acre of industrial land in Thorold Township. The four cities have an average industrial density ratio of 69 persons per acre.

The following features emerge from the forecasted industrial expansion under the existing density approach, (Tables 5.2 and 5.3).

(1) The industrial component comprises 13.5% of the total urban land requirements 1966-1996.

(2) Industrial acreage is estimated to expand from 7,071 acres in 1966 to 13,354 acres in 1996. This constitutes a net increase of 6,283 acres or a 89% increase in total industrial acreage.

(3) The four cities account for 83.5% of the forecasted 1966-1996 industrial expansion. The Township of Thorold makes up 40% of the total industrial expansion in the townships.

(4) The 1966 distribution of industrial acreage shows a high degree concentration. This is a result of a number of priming elements - Welland Ship Canal, Queen Elizabeth Way - which have structured industrial location within the Study Area.

5.3.3 Commercial Expansion

The present ratio of population per net acre of commercial land[11] was calculated and then applied as a constant to the population growth estimates. The 1966 commercial density factors ranged from 370 to 32 persons per acre in Hamilton and Niagara Falls respectively. The low commercial density factor for Niagara Falls is accounted for by the fact that about half is tourist commercial.[12]

The following trends emerge from Tables 5.2 and 5.3:

(1) The commercial component constitutes 7% of the total 1966-1996 land requirements.

(2) Total commercial acreage shows an expansion from 3,171 acres in 1966 to 6,734 acres in 1996. This is a net increase of 3,562 acres or 112% over 1966.

(3) The four cities make up 51% of the total 1966-1996 commercial land requirements. Saltfleet Township accounts for a major portion (44%) of 1966-1996 commercial land needs in the townships.

5.3.4 Recreation Expansion

The present ratio of population per acre of 1966 recreational land use was calculated and then applied as a constant to the population growth estimates. Recreational land use includes both private and public recreational development.

Recreational density factors for 1966 ranged from 12.5 persons per acre of residential land in Pelham Township to 187 persons per acre in Saltfleet Township. The magnitude of

this range reflects the fact that no distinction was made between municipal and regional recreational development in 1966 land use totals for each municipality. For example, the presence of a regional park, such as Effingham Provincial Park in Pelham Township, results in a significantly higher ratio of population per acre of recreational land. The nature and extent of this type of occurrence is reflected in the 1966-1996 recreation expansion totals for each municipality presented in Tables 5.2 and 5.3.

The following features emerge from the forecasted recreational land expansion under the existing density method:

(1) The recreation component comrpises 14% of the total urban land requirements 1966-1996.

(2) Recreation acreage is estimated to expand from 5,483 acres in 1966 to 12,523 acres in 1996 - a net increase of 7,040 acres.

(3) The expansion of recreational land use, 1966-1996 is about equal for both the townships (48.6%) and the cities (51.4%).

5.3.5 Transportation and Utilities

Transportation and utilities account for 10 per cent of the total urban land requirements in the Study Area. Under the existing density approach 5,181 additional acres will be required by 1996. This total and the 1966 land use acreage figure presented in Table 5.2 do not include the approximately 9,400 acres outlined as follows:

(1) Ontario Hydro owns 3,000 acres in Niagara Falls and 500 acres in Niagara Township.

(2) The DeCew Falls - Gibson's Lake Hydro complex covers 2,000 acres in St. Catharines and Thorold Township.

(3) Existing Welland Ship Canal (2,000 acres) and some 1,900 acres being acquired for the proposed relocation of the canal.

5.4 DEMAND FOR AGRICULTURAL LAND

In order to ascertain the future land requirements of agriculture, it is necessary to view the Niagara Fruit Belt within the Provincial and even the National setting.

5.4.1 Orchards

Consumption of Fruit: From the outset, it should be stated that Canada's consumption of fruit of the type grown in the Niagara Peninsula exceeds the country's ability to supply. This is illustrated by imports of 44,962 tons of peaches in 1967.[13] Moreover, per capita domestic consumption of fruit has been rising for fruit of all kinds. Before the last war, total consumption of fruit was around 138 lbs. per person.[14] In the 1950's, it had reached 215 lbs. per person while the 1966 figure is 251 lbs. per person,[15] almost double the pre-war figure. The consumption of the fruit grown in the Niagara Peninsula[16] changed from 50.7 lbs. to 57.8 lbs. per person between 1958 and 1966.

Consumption of individual fruits grown in the Niagara Fruit Belt varies from year to year depending on the availability of the particular fruit but is generally increasing. The 1966 domestic disappearance of fruit gives a good indication of the desirability of the individual fruit with apples at 38.5 lbs. per capita, peaches at 8.7 lbs. per capita, pears at 5.7 lbs. per capita, plums and prunes at 2.0 lbs. per capita and cherries at 1.8 lbs. per capita.[17]

Supply: Nationally, the Niagara Fruit Belt accounts for over 60 per cent of the peach and cherry production, 45 per cent of the pears, plum and prune production and 0.8 per cent of the apple production.[18] In Ontario, as expected, the proportion of fruit production supplied by the Niagara Fruit is substantially higher ranging from 87 per cent for plums and prunes through 83 per cent for cherries, 78 per cent for peaches and pears to 3 per cent for apples.[19]

Yields Per Acre: In order to relate consumption to land requirements, it was necessary to obtain the average yield of the different types of tree fruits. By analysing production in the fruitlands in relationship to the acreage, the following yields per acre resulted; peaches with 4 tons per acre; cherries (sweet and sour) with 2.3 tons per acre; pears with 6.4 tons per acre; plums and prunes with 3.6 tons per acre and apples with 2.5 tons per acre.

Future Demand: With the population of Ontario rising (Table 5.1), there will be an increased demand for fruit. By adopting the previously mentioned consumption statistics for specific fruits and multiplying by the change in population, it was possible to obtain the additional amount of fruit required by 1996.

From the predicted increased demand for fruit, the Niagara Fruit Belt was assumed to supply a certain proportion based on the quantity of Ontario's fruit production presently supplied by the area. Once these quantities are established, the acreage requirement can be ascertained by dividing the yield per acre of the different types of fruit into the increased amounts required. Table 5.4

illustrates the future demand for fruit and the amount of land necessary to meet this demand.

TABLE 5.4

QUANTITY OF FRUIT AND LAND REQUIRED TO MEET FUTURE DEMANDS

Fruits	Per capita Consumption[a] (lbs.)	Additional Fruit for Ontario 1966-1996 (tons)	NFB Production as % of Ontario[b]	Additional Fruit Supplied by NFB 1966-1996 (tons)	Yields per acre (tons)	Land Req'd. for Add'l. Fruit (acres)
Peaches	8.7	26,409	78	20,652	4.0	5,163
Cherries	1.8	5,464	83	4,557	2.3	1,981
Plums & Prunes	2.0	6,071	87	5,379	3.6	1,494
Pears	5.7	17,302	79	13,617	6.4	2,128
Apples	38.5	116,867	3	3,272	2.5	1,309
TOTAL	56.7	172,113	-	47,477	-	12,075

a "Apparent per capita Domestic Disappearance of Food in Canada" 32-226, Dominion Bureau of Statistics.

b Calculation from Ontario Department of Agriculture and Food, Agricultural Statistics for Ontario 1966, (Ontario, 1967), pp.67-72.

Although over 12,000 additional acres are required in order for the Niagara Fruit Belt to continue to fulfil its role as a major supplier of fruit, this acreage is a conservative estimate. The demand for fruit is based only on Ontario's projected population increase. Moreover, no attempt was made to account for increased consumption of

fresh and canned fruit and fruit juice.

At present, imports are becoming an increasingly important source of fruit to meet the rising demands. In 1966, imports of a specific fruit into Canada, peaches, accounted for 47 per cent of all the peaches used in Canada during that year; whereas the Niagara Fruit Belt produced 34 per cent of the total. Since the demand for peaches in Ontario, based on population, is, at least 31 per cent of the total, it is a correct assumption that some peaches are sold beyond the Ontario market but in Canada.[20] By taking only the Ontario market, a minimum acreage has been determined to meet Ontario's future demand while, no account has been made for shipments of fruit to other parts of Canada. Thus, imports, for analysis purposes, are not assumed to supply a portion of the future demand in Ontario but are for the rest of Canada.

5.4.2 Vineyards

Consumption: Since comparable data was not available for grapes, a slightly different approach was necessitated. By far the largest users of grapes are the wineries with a purchase of over 36,000 tons in 1966, 62 per cent of the total crop.[21] One factor for the large percentage of grapes going to the wineries is the increased consumption of Canadian wine from 0.24 gallons per capita in 1937 to 0.4 gallons per capita in 1965.[22] This trend of increased consumption was projected through to 1996 resulting in 0.64 gallons per capita. This is a conservative estimate as per capita wine consumption in the United States and Australia today is, respectively,

about two and two and one-half times the Canadian level.

The use of grapes for jams and juice has fluctuated over the last five years but is generally rising at the rate of 99 tons per year. Domestic and local sales of grapes have varied greatly in the past and for that reason it is difficult to predict the future demand. However, with the expanding population, an additional 10 tons of grapes per year were alloted for this type of consumption.

Supply: The Niagara Fruit Belt is the dominant grape growing area in Canada with 94 per cent of Canada's production and almost 99 per cent of Ontario's.

Yields Per Acre: Grapes yield an average of 2.7 tons per acre. This represents a slight increase of 0.2 tons per acre from the 1959 to 1962 period.[23] However, the yield per acre can change considerably over a period of time because of changing climatic conditions.

Future Demand: Based on the present and future demand and the present yield per acre, the future tonnage and acreage requirements for this fruit can be ascertained, (Table 5.5).

The additional 7,536 acres, while accurately reflecting the Ontarian's future demand for grapes, does not indicate the National need. Since 94 per cent of all grapes are currently grown in the Niagara Fruit Belt, it may be more realistic to predict something in the nature of double the indicated amount. In this vein, the 7,500 acres plus should be viewed as a minimum amount of acreage required for expansion of vineyards.

5.4.3 Allocation of Orchards and Vineyards by Municipality

Table 5.6 presents a hypothetical allocation of 1996 orchards

TABLE 5.5

QUANTITY OF GRAPES AND LAND REQUIRED
TO MEET FUTURE DEMAND

Grapes For	Additional Grapes for Ontario 1966-1996 (tons)	Yield per Acre (tons)	Land Required for Additional Grapes 1996 (acres)
Wine	17,071		6,324
Jam and Juice	2,970	2.7	1,101
Domestic and Local Sales	300		111
TOTAL	20,341		7,536

and vineyard by municipality. The acreage for orchards and vineyards was allotted to each municipality on a proportionate basis having regard for the physical capabilities of the area. In urban centres, the future land requirements for urban purposes were deemed to gradually replace orchards and vineyards. By 1996, there are no fruit growing areas left within the boundaries of urban areas. Saltfleet and Thorold Townships are also considered to lose all their fruitland by 1996 due to urban pressure from the neighbouring cities. For the remaining townships; namely Niagara, Louth, Clinton, North Grimsby, and Pelham Townships; it is estimated that they will double their present acreage (1966) in orchards and vineyards by 1996 (Table 5.6). This expansion is necessitated not only by increased demand but also to compensate for the loss of fruitlands in other areas of the Niagara Fruit Belt.

TABLE 5.6

ORCHARDS AND VINEYARDS BY MUNICIPALITY
(1966 TO 1996)

	1966[a]		1996		Change	
	Orchards (acres)	Vineyards	Orchards (acres)	Vineyards	Orchards (acres)	Vineyards
TOWNSHIPS						
Niagara	5,752	4,513	11,330	8,442	5,578	3,929
Louth	3,686	4,102	7,286	7,754	3,600	3,652
Clinton	4,185	4,099	8,227	7,754	4,042	3,655
North Grimsby	1,641	1,725	3,242	3,173	1,601	1,448
Saltfleet	2,129	2,526	-	-	-2,129	-2,526
Thorold	377	689	-	-	- 377	- 689
Pelham	2,419	1,117	4,776	2,814	2,357	1,697
CITIES						
Niagara Falls	429	746	-	-	-429	-746
St. Catharines	1,787	2,584	-	-	-1,787	-2,584
Welland	-	-	-	-	-	-
Hamilton	381	300	-	-	-381	-300
NIAGARA FRUIT BELT	22,786	22,401	34,861	29,937	12,075	7,536

[a] Byron E. Beeler, "Niagara District Tree Fruit and Vine Census using 1965 Aerial Photography," Report given at the 71st Annual Convention of the Niagara Fruit and Vegetable Growers Association, November 30, 1966.

By 1996, about 35,000 acres will be required for orchards and 30,000 for vineyard, an increase of 35 per cent and 25 per cent respectively over the 1966 totals.

5.5 SUMMARY AND CONCLUSION

An addition of some 536,000 people between 1966 and 1996 in the Niagara Fruit Belt will create a demand for some 51,800 additional acres of urban land - about equal to the rurban area. This constitutes

a 102% increase in urban land use; an absolute increase from 50,723 acres of urban land in 1966 to 102,450 acres in 1996. As a result of the doubling of the urban built-up area between 1966 and 1996, 45 per cent of the Fruit Belt will be covered by some form of urban development in 1996. The urban built-up area in 1996 will have an overall population density of 7,135 persons per square mile, which is reasonable for present living patterns.

The 1966-1996 expansion in urban land use is distributed as follows: industrial 6,283 acres (12%); commercial 3,563 acres (7%); residential 29,737 acres (57%); recreational 7,040 (14%) and transportation and utility 5,185 acres (10%). The fact that the residential component comprises over half of the 1966 to 1996 demand for urban land, emphasizes the overriding importance of residential expansion in the determination of regional form. Great variations exist between the municipalities in the land used for industrial and recreational purposes. Both of these major land uses have particular locational and resource requirements and are characterized by an economic base extending beyond local boundaries.

The seven townships make up 38.5 per cent of the total 1966 to 1996 urban land requirements, an increase from 28 per cent in 1966.

As a check on the existing density method a calculation of 1996 land needs was made on the basis of presently operative planning standards. These standards and land requirements by use and municipality are summarized in the table in Appendix D. When compared with Table 5.3 giving requirements on the basis of population/land densities,

the "standards" figures show one or two wide discrepancies - approximately 6,000 acres less residential land would be required. But the overall difference is not much in excess of 3,600 acres. This underscores the observation that the main point at issue is not the amount of land required for urban development, but its spatial distribution in relation to productive farmland, and the control and limitation of the urban shadow.

The demand estimates for all activities suggest that in the period ahead this issue of the spatial allocation of land in the Fruit Belt will become increasingly sharper and critical. There are approximately a total of 250,000 acres of land in the Niagara Fruit Belt. The Study has estimated the following 1996 basic land requirements:

Urban	102,500
Orchards and Vineyards	65,000

If two not unreasonable assumptions are made: that the rurban area will continue to bear a 1:1 ratio to the built-up area and that other farming types will continue to occupy about 20,000 acres of land, total needs are estimated at 290,000 acres. Something has got to give. It would appear to be a wise and prudent policy to find a way of reducing the urban shadow, and to explore alternative development patterns adjacent to and outside the Niagara Fruit Belt.

LIST OF REFERENCES

CHAPTER V

1. For purposes of analysis, township totals include a number of incorporated towns and villages: i.e. Saltfleet Township (Stoney Creek), North Grimsby Township (Grimsby), Clinton Township (Beamsville), Niagara Township (Niagara-on-the-Lake), Thorold Township (Thorold), and Pelham Township (Fonthill).

2. Hamilton is thought to be a likely source of a significant amount of future urban growth in the Study Area. Therefore, Hamilton was included in the analysis of future land requirements in order to assess the potential although not completely predictable spill-over effect of urban development from Hamilton into Saltfleet and North Grimsby Townships.

3. Additional specific qualifications and assumptions have been made explicit at appropriate points throughout the chapter.

4. Welland Area Planning Board, Land Use Areas for Welland, 1964 and Selected Urban Centres, Niagara Region, 1961, Welland Area Planning Board, Welland, 1964.

5. Metropolitan Toronto and Region Transportation Study, Choices for a Growing Region, Department of Municipal Affairs, Toronto, November, 1967, p.19.

   Larry Smith & Co., Study of Regional Economic Prospects, MTART Study, Toronto, February 1, 1965, IV-8.

6. Gross residential in this case means the total area occupied by residential land use including service streets, parking, schools, churches and other institutional land use. It does not include private or public recreational open space or commercial land use.

7. Metropolitan Toronto and Region Transportation Study, p.16.

8. Non-contiguous or scattered development is defined as any urban type of land use occupying less than five acres which is not within the corporate limits of a city, town or village and is not an extension to the urban built-up area of a city, town or village. On the basis of the above definition, the amount of non-contiguous or scattered residential and commercial development was measured from the Niagara Escarpment Study Predominant Land Use Maps, 1966. The following highlights emerged from this analysis:

(1) The amount of non-contiguous development (1966) ranged from 74.5% of total urban development in Louth Township to 22.8% in Clinton Township.

(2) The average amount of non-contiguous or scattered development in the townships was 45% of total urban development.

9. Gross industrial acreage includes the total area occupied by an industrial facility including service streets, parking and landscaping. It is important to note that the 1966 industrial figure does not include the present Welland Ship Canal (2,000 acres) and that the forecasted land requirements do not take into account the some 1,900 acres which will be lost to the future relocation of a section of the canal.

10. Acres Research and Planning in their report The Welland Canal Railway Crossing Study - Land Use Appraisal, Appendix A, p.11, estimate that the three cities of Welland, Niagara Falls and St. Catharines will experience an average 3.5% relative decline in industrial employment, 1966-1991. This is assumed to be indicative of a trend in the Study Area.

11. Includes all commercial land use.

12. Parkway Consultants, Niagara Escarpment Scenic Drive, Technical Report, Volume I, Toronto, 1968.

13. "Imports by Commodities" 65-007, Dominion Bureau of Statistics.

14. R. K. Matthie, "The Position of Niagara's Fruit Industry," Paper read at a Seminar on Land Use Problems in Ontario sponsored by the Conservation Council of Ontario, Vineland, Ontario, November 26-28, 1958.

15. "Apparent per Capita Domestic Disappearance of Food in Canada" 32-226, Dominion Bureau of Statistics.

16. The types of fruit are apples, cherries, peaches, pears and plums. Grapes are given separate consideration.

17. "Apparent per Capita Domestic Disappearance of Food in Canada."

18. "Value of Fruit Production" 22-033, Dominion Bureau of Statistics.

19. Ontario Department of Agriculture & Food, Agricultural Statistics for Ontario 1966, (Ontario, 1967) pp.67-72.

20. Exports of peaches, although oscillating, are negligible with only 19.8 tons in 1966. "Exports by Commodities" 54-004, Dominion Bureau of Statistics.

21. Ontario Department of Agriculture & Food, 1966 Fruit Tree Census: Part I, Grapes, (Ontario, 1968), p.5.

22. William F. Wiley, "Geographical Study of the Winery Establishments in Southern Ontario," (unpublished B.A. thesis, University of Waterloo, 1967), p.69.

23. Ontario Department of Agriculture & Food, Grape Cost Production Study, A Report prepared by the Farm Economics, Co-operatives and Statistics Branch (Toronto, 1965).

CHAPTER VI

THE IMPACT OF PUBLIC POLICIES

The future of the Fruit Belt is being shaped day-to-day by a multitude of private and public decisions. The overall effect of these are "written" on the face of the land, and are recorded in the report maps on Orchards and Vineyards, 1965 (folded map in back pocket), Built-Up Areas, 1934 and 1965 (Map 4), Rurban Properties 1967 (Map 5) and the series of maps in Appendix B. An essential part of this inventory of conditions in the Fruit Belt is to interpret the effect of established public policies, and their expression in programmes and projects, on the broad pattern of future development in the Fruit Belt.

6.1 MUNICIPAL POLICIES

Land use at the local level is shaped primarily by Official Plans, prepared, adopted and approved in accordance with the Planning Act of Ontario.

Table 6.1 summarizes the land policies of the municipalities in the Fruit Belt, and Map 6 illustrates the designation of land in Official Plan documents under seven categories of predominant land use. Municipal policies fall into four broad categories: the preservation of rural character - Niagara Township; limited and selective urban development, with maintenance of the more productive agricultural areas - Welland Area Plan, including in the Fruit Belt, the Townships of Pelham and Thorold, the City of Welland, and the Village of Fonthill; gradual urbanization with varying degrees of

TABLE 6.1

OFFICIAL PLANS IN THE NIAGARA FRUIT BELT - INTERPRETATION OF LAND USE EFFECTS

	General Policy	Rural Land Policy	Urban Land Policy	Land Balance - Official Plan and Projected Demand
NIAGARA TOWNSHIP Population: 12,463* Area: 31,133A* Area, Tender Fruit Soil: 6,840A * - includes Niagara-on-the-Lake	- stop uncontrolled urban development - preserve rural character of township	- agriculture, predominant land use in township - no residential lots in agricultural district	- three residential categories - suburban, rural and summer - rural residential only under conditions where costly services not required - major subdivision restricted until pollution controls effective - major residential designations - Niagara-on-the-Lake, Queenston, St. David's and Niagara Parks route - scattered, small scale industrial	1976 Official Plan date Balance - surplus, 1,880A. total, including 1,000A residential 1996 Projected Demand Balance - 1996 deficiency, 48A. total, surpluses offset by deficiency, residential 150A., and commercial 230A.

TABLE 6.1 Cont'd.

	General Policy	Rural Land Policy	Urban Land Policy	Land Balance - Official Plan and Projected Demand
CLINTON TOWNSHIP Population: 9,701* Area: 26,832A* Area, Tender Fruit Soil: 2,740A *includes Beamsville	- urbanization emphasized and corollary decline in importance of agriculture - central goal - an orderly extension of urban development into rural area - long range conceptual plan, 70,000-80,000 people centred on Beamsville, with related development in North Grimsby and Louth.	- agriculture encouraged on best soils - non-farm residential, "a limited scale and at a very low density." - "deferred industrial" uses within agricultural districts	- residential subdivisions in Vineland and, Beamsville, particularly to the west, and at the Village of Campden, at the junction of County Roads 15 and 24 - industrial area, large-scale, north of Beamsville adjacent to QEW.	1991 Official Plan date Balance - surplus, 750A. total - deficiency, 350A. residential and 30A. commercial

TABLE 6.1 Cont'd.

	General Policy	Rural Land Policy	Urban Land Policy	Land Balance - Official Plan and Projected Demand
TOWNSHIP OF NORTH GRIMSBY (including the separate but related plan for the Town of Grimsby) Population: 13,814* Area: 16,046A* Area, Tender Fruit Soil: 2,500A * includes Grimsby	- urbanization of the Fruit Belt	- agriculture confined to Plain above the Escarpment	- entire plain below the Escarpment will have some form of urban development, predominantly residential - new urban development shall be served with "basic services"	1976 Official Plan date Balance - 1976, surplus N. Grimsby 2,518A Grimsby 50A deficiency, minor in Town for commercial and residential Balance - 1996 surplus N. Grimsby 650A. deficiency, Town 870A., particularly in residential (790A.) deficiency, N. Grimsby confined to commercial and recreational only.

TABLE 6.1 Cont'd.

	General Policy	Rural Land Policy	Urban Land Policy	Land Balance - Official Plan and Projected Demand
TOWNSHIP OF SALTFLEET Population: 25,227* Area: 23,971A* Area, Tender Fruit Soil: 5,450A * includes Stoney Creek	- a five year plan only, to 1970 - scattered, haphazard urban development to be curtailed - residential development where water supply and sanitary services can be provided	- first priority to the "Western Development Area" - Lake Ontario to Niagara Escarpment, limits of City of Hamilton to 1½ miles east - extensive industrial area about five miles along the south side of the Q.E.W.	- no direct concern with agricultural land, or impact of urban growth on economy and society of rural area	1970 Official Plan date Balance - 1976 surplus, total 2,116A. with deficiency of 475A. commercial Balance - 1996 deficiency 2,175A. in all categories except recreational and industrial.

TABLE 6.1 Cont'd.

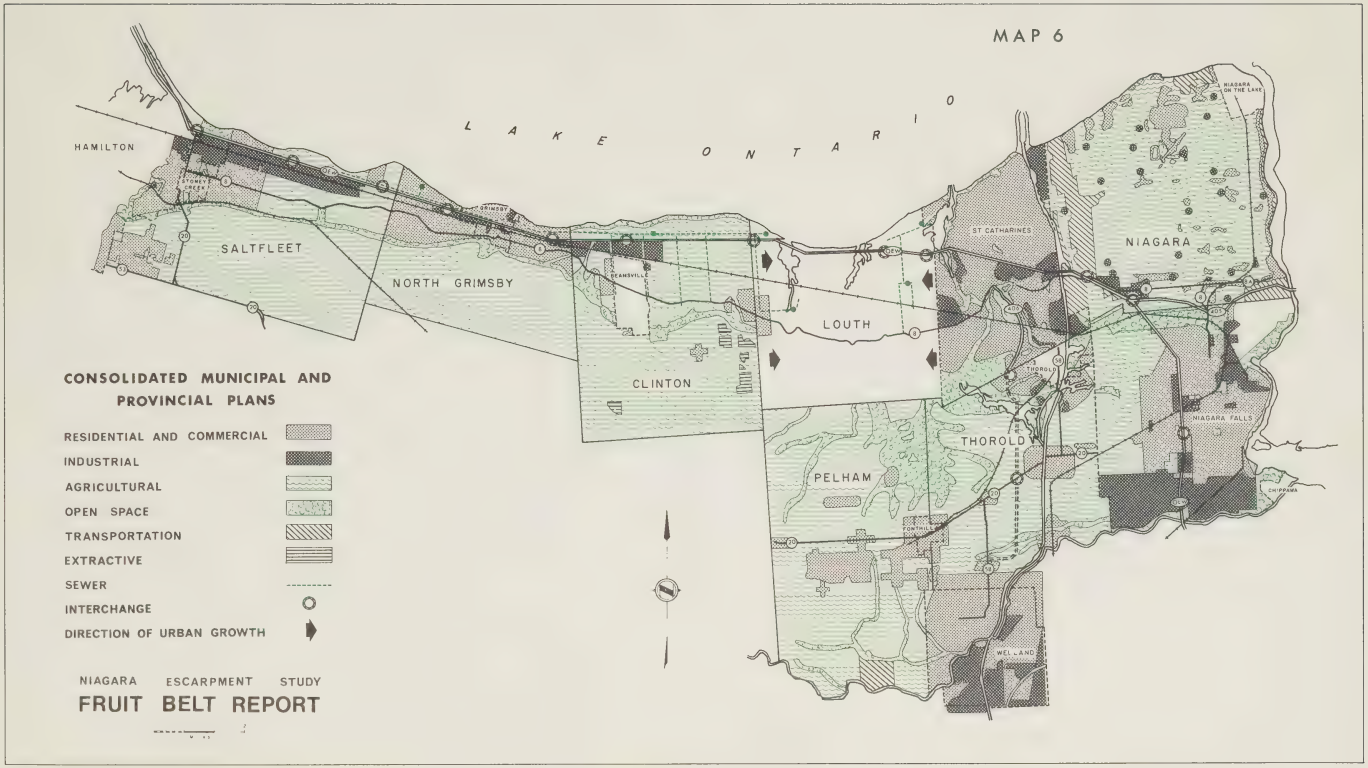
	General Policy	Rural Land Policy	Urban Land Policy	Land Balance - Official Plan and Projected Demand
WELLAND AREA PLAN including, Township of Pelham Township of Thorold Village of Fonthill City of Welland Population: 64,974* Area: 571,444A* Area, Tender Fruit Soil: 7,790A *includes Town of Thorold	- urban growth to be channelled into areas of poorer agricultural soils. Fonthill Kame and other productive soils to be preserved for agriculture.	- urban development guided to new areas around Welland, Thorold, Fonthill and junction of Hwys. 20 and 18. This appears, in part, contradictory to stated aim, as some of the more productive soils will be affected - particularly area of highly intensive fruit farming west and south of Fonthill.	- preservation of prime agricultural land	Balance, 1996 Thorold, surplus 3,170A Pelham, surplus 4,270A within this there are some deficiencies - most significant, Thorold, 518A. industrial. Welland, surplus 2,310A. with recreational deficit of 370A.

TABLE 6.1 Cont'd.

	General Policy	Rural Land Policy	Urban Land Policy	Land Balance - Official Plan and Projected Demand
CITY OF ST. CATHARINES Population: 97,101* Area: 17,000A* Area, Tender Fruit Soil: 6,260A	- Long range concept - 200,000 people by year 2000, extending west into Louth Township, south to Lake Gibson and east to Welland Canal, with major growth into Louth.	- extent and direction of new development on the basis of projected average densities and the "Logical extension" of present land use patterns. Residential - N.,W., and S. to Lake Gibson. Industrial - on the W. and E. sides of the City	- no direct concern, by implication, the remaining orchards and vineyards in the former Grantham Township and in part of Louth will give way to urban development.	1985 Official Plan Balance - 1986 surplus total 2,490A. Balance - 1996 deficiency total, 1,000A. residential 1,200A.

TABLE 6.1 Cont'd.

	General Policy	Rural Land Policy	Urban Land Policy	Land Balance - Official Plan and Projected Demand
CITY OF NIAGARA FALLS				
Population: 60,768*. Area: 24,863A* Area, Tender Fruit Soil: 1,990 *includes Chippawa	- Orderly extension of urban development into farming area, and maintenance of the integrity farming areas until urban development is scheduled.	- Agricultural area, W. of Q.E.W. designated "Rural" permitting farming and forestry and industrial and commercial enterprises associated with farming; and limiting the spread of non-farm residences.	- Concentration and consolidation of urban development E. of Q.E.W., and no development W. of Q.E.W. until residential districts E. of Q.E.W. are built-up.	1985 Official Plan date Balance - 1986, surplus 6,549A., including 281A. residential Balance - 1996 surplus, 4,558A total deficiency residential, 961A.
LOUTH TOWNSHIP				
Population: 5,677 Area: 18,326A Area, Tender Fruit Soil: 6,640A	- No Official Plan	- subject to urban pressure from St. Catharines and Clinton Township - Mayo proposal suggests new St. Catharines boundary two miles W. to Fifteen Mile Creek.	- good farming area, unprotected	- No Official Plan figures for comparison with Demand


MAP 6
L A K E O N T A R I O
HAMILTON
SALTFLEET
NORTH GRIMSBY
CLINTON
LOUTH
PELHAM
THOROLD
ST CATHARINES
NIAGARA
NIAGARA FALLS
WELLAND
CONSOLIDATED MUNICIPAL AND PROVINCIAL PLANS
RESIDENTIAL AND COMMERCIAL
INDUSTRIAL
AGRICULTURAL
OPEN SPACE
TRANSPORTATION
EXTRACTIVE
SEWER
INTERCHANGE
DIRECTION OF URBAN GROWTH
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT

orderly extension into farming areas - City of Niagara Falls, City of St. Catharines, Townships of Clinton, North Grimsby and Saltfleet; and no official plan policy, leaving the area vulnerable to scattered, uncoordinated development - Louth Township. The Study's evaluation of these policies suggests that the orchard and vineyard areas most susceptible to urban development outside city boundaries are: Louth Township, which has been identified as a major development path by St. Catharines, and which has no Official Plan; North Grimsby, where the entire sand plain below the Escarpment is designated for urban development within eight years; and Saltfleet which has no projected policy beyond 1970, and which has designated a substantial industrial district, extending for five miles along the Q.E.W. The municipalities pursuing a policy of gradual urban development contain about 64 per cent of the tender fruit soils within the Study Area.

6.2 URBAN LAND REQUIREMENTS IN RELATION TO OFFICIAL PLANS

In the preceding chapter an estimate was made of 1996 land needs based on the projection of 1966 population/land ratios for major urban activities. This was found in relation to current planning standards to be a more than adequate provision. Some sense of the validity of Official Plan space allocations for the major urban activities is obtained by comparing the demand figures with the actual areas designated in the Official Plans. The results of this comparison are shown in the last column of Table 6.1, both for the year approximating the Official Plan date and for 1996, which is the date of the projection of urban land requirements. The summary for

all Official Plan municipalities is given in Table 6.2. Figures under the "Official Plan" columns are for the terminal dates of each Official Plan, and these vary from 1970 for Saltfleet to 1991 for Clinton; figures under the "Demand" columns are the estimated total acreage required in 1996. The comparison shows quite decidedly an overall surplus of designated urban land over 1996 urban requirements. Within the overall surplus certain municipalities - Niagara and Saltfleet Townships and the City of St. Catharines have deficiencies, mainly of residential land. The total area indicated in the Official Plans, some 102,700 acres is sufficient to provide for total projected urban development, including Louth (See Sections 3.2 and 5.5), on the assumption that adjustments can be made between municipalities and between land uses.

6.3 FEDERAL AND PROVINCIAL POLICIES

There are a large number of senior government agencies, mainly provincial, which in some way affect the use and development of land in the Fruit Belt. These are listed and their relevant activities and land effects are summarized in Table 6.3. Their impact on the Fruit Belt is exerted in different ways, as follows:

through land use policy.

The Minister of the Department of Municipal Affairs through the Community Planning Branch, can influence the patterns of development by supervision of Official Plans and subdivisions, and, through this statutory role, invokes a development policy in rural areas which restrains the fragmentation of farmland; however, the Branch has

TABLE 6.2

URBAN LAND REQUIREMENTS (1966) IN RELATION TO OFFICIAL PLANS

	INDUSTRIAL			COMMERCIAL			RESIDENTIAL			RECREATIONAL			TOTAL		
	Official Plan	Demand	Balance	Official Plan	Demand	Balance	Official Plan	Demand	Balance	Official Plan	Demand	Balance	Official Plan	Demand	Balance
TOWNSHIPS															
Niagara	355	212	+ 143	25	256	- 231	2,480	2,622	- 142	1,290	1,108	+ 182	4,150	4,198	- 48
Clinton	560	25	+ 535	40	69	- 29	680	1,034	- 354	1,060	435	+ 625	2,340	1,563	+ 777
North Grimsby	230	43	+ 187	135	222	- 87	2,965	2,163	+ 802	755	1,004	- 249	4,085	3,432	+ 653
Saltfleet	1,930	415	+1,515	125	1,262	-1,137	3,295	6,075	-2,780	650	423	+ 227	6,000	8,175	- 2,175
Thorold	350	868	- 518	120	271	- 151	3,280	2,085	+1,195	3,080	437	+2,643	6,830	3,661	+ 3,169
Pelham	-	30	- 30	80	159	- 79	3,780	1,458	+2,322	3,400	1,341	+2,059	7,260	2,988	+ 4,272
CITIES															
Niagara Falls	5,237	2,166	+3,071	1,402	786	+ 616	7,022	7,983	- 961	3,700	1,868	+1,832	17,361	12,803	+ 4,558
St. Catharines	2,755	2,421	+ 334	555	1,432	- 877	11,260	12,459	-1,199	2,230	1,495	+ 735	16,800	17,807	- 1,007
Welland	3,040	1,877	+1,163	360	304	+ 56	5,000	3,539	+1,461	200	572	- 372	8,600	6,292	+ 2,308
Hamilton	6,000	5,056	+ 944	1,440	1,422	+ 18	19,500	15,325	+4,175	1,500	4,160	-2,660	28,440	25,963	+ 2,477
TOWN															
Grimsby	141	99	+ 42	64	189	- 125	596	1,383	- 787	31	31	-	832	1,702	- 870
TOTAL	20,598	13,212	+7,396	4,346	6,372	-2,026	59,858	56,126	+3,732	17,896	12,874	+5,022	102,698	88,584	+14,114

TABLE 6.3

FEDERAL AND PROVINCIAL POLICIES, FRUIT BELT - LAND DEVELOPMENT EFFECTS

Agency	Policies, Programmes or Projects	Land Effects
FEDERAL		
St. Lawrence Seaway Authority	Welland Canal - new alignment south of Welland to Lake Erie 4,000 acres, north of Welland to Lake Ontario, 1,900 acres	- Land for Canal Diversion north of Welland, acquired through fruitlands 650 acres of farmland will be trapped between the existing canal and the future new canal.
Department of Finance and Department of National Revenue	Anti-dumping legislation (Customs Tariff Act)	- positive, enhance overall economic stability of fruit farming in the region.
FEDERAL-PROVINCIAL		
Central Mortgage & Housing Corporation and Ontario Housing Corporation	Land Assembly - St. Catharines - 300 lots - Niagara Falls, south of Lundy's Lane - 48.4 acres, 180 lots - Hamilton - Saltfleet, east of Mt. Albion, 1,500 acres	- positive, provides channel for development on less productive agricultural land.
PROVINCIAL		
Department of Municipal Affairs - Community Planning Branch	Development policy - rural areas - groups of three or more dwellings must be adjacent to existing urban development, and be serviced.	- A brake on fragmentation of farmland, but subdivision control does not preclude severances for single family dwellings in rural areas.
	Official Plans, Zoning By-Laws (Ontario Municipal Board approval).	- Provincial supervision particularly of Official Plans provides opportunity for applying broad land use policy, but no specific policy for Fruit Belt, in effect.

TABLE 6.3 Cont'd.

Agency	Policies, Programmes or Project	Land Effects
DMA Cont'd.	Subdivision control requiring Ministerial review and approval of subdivisions	- General rural area policy can be enforced as all Fruit Belt municipalities have subdivision control by-laws; loophole-severances by description.
DMA - Assessment Branch	- Assessment of farmlands and buildings on the basis of present use (Assessment Act S.35(3)) - Farmland tax exemption (blocks 5 or more acres) for services not directly serving farm properties. (Assessment Act, S.37). - Branch policy, to reassess at present market value on basis of sales, in the case of agricultural land from farmer to farmer.	- Combined effect should be to supress tax pressures, leading to conversion of use from rural to urban - tax rate in areas of scattered urban development may create financial pressure on farms.
DMA - Research Branch	- Regional Local Government Review - the Mayo Report.	- Could have major implications for future land use development in the region.
Ontario Water Resources Commission	- Capital investment in major water and sewer facilities, at request of municipalities, bearing amortized cost. - Lincoln County sewerage system for the municipalities of Louth, Clinton - including Vineland Village, North Grimsby, and Saltfleet, based on agreements with municipalities - Feasibility studies under way for Town of	- Premised on long term general urbanization of the Fruit Belt - Facilities with capacities to service farming areas, will create pressure to urbanize below Escarpment, including tender fruit soils. - (See - proposed system, Map of Consolidated Municipal Plans from OWRC commissioned report on Sewerage and Sewage Treatment Requirements for the County of Lincoln.

TABLE 6.3 Cont'd.

Agency	Policies, Programmes or Project	Land Effects
OWRC Cont'd.	Niagara - sewers and water, Township of Niagara - sewers,	
Department of Agriculture & Food	- ARDA, Agricultural Rehabilitation and Development Act - Improve productivity of the farm unit, research and extension services, reform management and marketing - Study on farm income, (Hedlin, Menzies & Associates Ltd.)	- No effect; farm consolidation only where land less than $100 per acre - Strengthens the farm economy in the face of more highly subsidized foreign products - May provide guide lines for stable and more adequate level of farm income - Foregoing will augment ability to resist urban pressures.
Department of Highways	- Niagara Peninsula Planning Study, highway needs, 1962-1985. - QEW improvements for fully controlled access - widening to 6-8 lanes - parallel service roads - 17 new grade separated interchanges. (land acquisition commenced and interchanges to be constructed within the next 6 years). - Highway 406, four-lane freeway from QEW west of St.Catharines to northern city limits, Welland; and	- Basis for current construction projects. Improvements will consume a total of 880 acres of mainly farmland (compared to 1,370 acres for the present right-of-way). - abutting farm reduced in size, maybe less viable. - Some loss and disruption of farmland in Louth, traversed by connection to QEW. - New highway plus Welland Canal, possible basis of north-south development corridor, St. Catharines - Welland, drawing off development from Fruit Belt, e.g. expansion of St. Catharines into Louth.

TABLE 6.3 Cont'd.

Agency	Policies, Programmes or Project	Land Effects
Department of Highways Cont'd.	from Welland to Hwy.3 (Section to Welland - scheduled completion, 5 years) - Highway, east side of canal - Thorold to Hwy. 3, recommended.	
	- Highway 20 - to be relocated, east of Welland Canal, and north of railway and Lundy's Lane	- No significant effects
	- Highway 8 - Improvement. Winona to Beamsville - realignment of curves Beamsville to St. Catharines: Alternatives considered:	
	(1) Upgrading - for 50-60 m.p.h. design speed - extensive reconstruction	- Interchanges might cut into slopes of the Escarpment.
	(2) Hwy.8 reverts to County road, maintained as scenic road at 40 m.p.h, County road #11 becomes Hwy. extended to Beamsville, and built to 50-60 m.p.h. design speed.	- Need for control of abutting land development in intensive fruit farming area.
Niagara Peninsula Conservation Authority	- No pertinent policies	Conservation influence on land use not a factor in the region.

TABLE 6.3 Cont'd.

Agency	Policies, Programmes or Projects	Land Effects
Niagara Regional Development Council	- Public Information and Education through publications, conferences, etc., e.g. Order in The Market Place.	- Influence on rural land use negligible.
	- Initiative in establishing Mayo study.	- Implementation of Mayo proposals will affect quality and comprehensiveness of land planning.

no specific policy governing the use of land in the Fruit Belt. through influencing the development pattern.

The Ontario Water Resources Commission, in response to requests for assistance from municipalities, could be instrumental, if present agreements with municipalities are carried through, in providing sewerage trunk and treatment facilities that would urbanize the entire agricultural area between St. Catharines and Saltfleet.

The Department of Highways exerts its influence both by the direct consumption of land for roads - scheduled improvements on the Q.E.W. will require approximately an additional 880 acres or an area equal to 64 per cent of the present Highway in the Fruit Belt; and by its indirect effect on the development pattern. Unless land use policies are fundamentally altered, the improved Q.E.W., with its parallel service roads, will become the basis of a more intensive development corridor between Niagara Falls and Hamilton. On the other hand, the new north-south Highway 406, scheduled for completion to Welland within the next five years and extending eventually to Highway 3, provides a new opportunity to open up an alternative development corridor, above the Escarpment on less valuable soils.

The Central Mortgage and Housing Corporation and the Ontario Housing Corporation (OHC), through their joint land assembly schemes, have the opportunity, particularly in these days of rising land values, to influence the urban pattern in the Fruit

Belt. This can be significantly augmented by OHC's initiation of new housing and residential communities. To the present, these agencies have tended to assemble housing land in and near established urban centres and off the best agricultural land.

In line with the "design for development" programme the Niagara Regional Development Council could in the future have a significant effect on the growth pattern through the formulation of a regional development plan. To the present, however, it has not assumed this role and its effect has been felt mainly through its publications and conferences. Concern with the fate of the fruitlands as such has not in recent years been a major preoccupation.

through the direct acquisition of farmland.

Reference has already been made to the land that will be acquired - some 880 acres - by Department of Highways for the improvement of the Q.E.W. In addition to land directly affected, a certain number of adjacent farms will be reduced in size and possibly suffer some disruption.

The St. Lawrence Seaway has acquired 1,900 acres of land in Niagara Township for the new right-of-way of the Canal Division north of Welland. Another 650 acres of farmland will be "trapped" between the old and new alignments of the Canal, and most likely will be converted to non-farm uses.

through direct and indirect effects on the rural economy.

The Department of Agriculture and Food, Ontario is concerned primarily with enhancing the productivity of the individual farm unit.

To the extent that this is achieved, farming is better able to resist the inroads of the real estate market. The base of operations in the Fruit Belt is the Horticultural Research Institute of Ontario at Vineland Station, where through combined Research and Extension branches a major contribution to the effectiveness of the farm economy has been made. The development and improvement of fruit species - such as the French Hybrid grape, a Vinifera species which not only produces more palatable wine but nets the grower a substantial income premium, research into the processing of fruits and vegetables, information studies such as the 1966 Fruit Tree Census and new techniques of census taking based on aerial photo interpretation, and day-to-day advice to farmers on production problems - are some of the major activities at Vineland Station that provide an underpinning to the farm economy.

Ever since the publication of the Louth Report more than ten years ago, there has been an awareness of the disproportionate tax burden on farm properties in the Fruit Belt, which is the "fall out" of scattered low density urban development. The Assessment Act and the policy of the Assessment Branch now act to moderate the tax pressure on land by basing assessment on market value for farm use. The tax rate is, however, still free to fluctuate in response to the rising cost of services, and the size of the tax bill continues to exert pressure for conversion to activities that promise to bring a higher return to the land - the average per capita tax bill in the three more rural municipalities; Niagara, Louth and Clinton, increased

from $47 in 1955 to $110 in 1996, or by 134 per cent.[1]

In the years ahead the taxation of farmland may be influenced by the implementation of the principles of the Smith Report.[2] There are four proposals that are relevant to the situation in the Fruit Belt:

(1) Relate land values to a pattern of land use made stable and comprehensive by an effective planning process.

(2) Establish differential tax rates in accordance with the service received by properties.

(3) Differential weight of taxation for different classes of tax payers, i.e. all properties be assessed at 100 per cent of actual current value but farm properties would be subject to tax on a taxable assessment of 50 per cent of the assessed value.

(4) Distinguish on farm properties between "working farm assessment" and residential assessment.

The combined effect of these measures would be to draw off the tax-based financial pressures to convert land from a rural to an urban use.

6.4 THE MAYO REPORT

The report of the Niagara Region Local Government Review (August, 1966) which was the product of an inquiry under Professor H.B. Mayo, Chief Commissioner, contained a number of recommendations directly concerned with the Niagara fruitlands.[3] The Ontario Government has not yet acted on the report recommendations, but the issues raised have been the subject of wide public debate during the past two years, and it is generally anticipated that the Review will result in some form of local government reorganization in the area of Lincoln and Welland Counties.

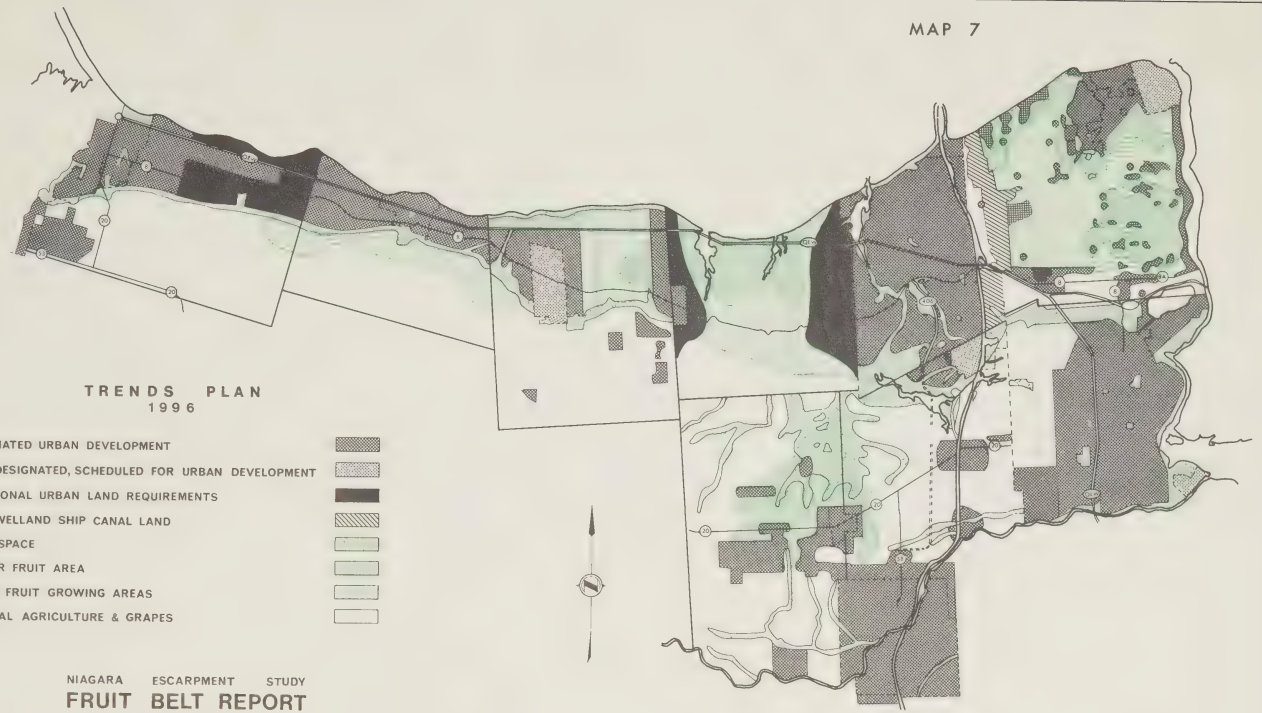
With regard to the fruitlands, the Report's recommendation is based on the assertion that "the Niagara fruitlands are a resource that cannot be replaced. Once they are put to urban use, the process will never be reversed." The proposed solution is the prompt preparation of a regional plan, by a region-wide authority, i.e. the Municipality of Metropolitan Niagara. The regional plan would, as one of its central pursuits, provide for orderly urban growth in a form that optimizes long range returns from the region's land resources.

This Study's evaluation of the Mayo Report suggests that its boundary proposal for the City of St. Catharines is in itself a demonstration, perhaps ironically, of the need for a regional plan. The Review Commmission was obliged to make its recommendations for the boundaries of constituent municipal units without the benefit of a regionally-based concept of future growth. As a consequence, inordinate weight was given to local criteria in determining boundaries, which in the case of Cities were based on the guideline that "cities... should be extended to take in present and anticipated built-up areas." In St. Catharines' case this led the Commission to recommend an extension of the western boundary deep into the highly productive land of Louth Township to Fifteen Mile Creek - about two miles from present City limits. Within a regional context, it will be possible to determine directions of urban growth on a broader basis than the economics of sewers.

6.5 THE TRENDS PLAN

The impact of all of the foregoing public policies on the

MAP 7



NIAGARA ESCARPMENT STUDY

FRUIT BELT REPORT

land of the Fruit Belt is illustrated in The Trends Plan (Map 7). This is an allocation of land use to 1996 based on the Official Plans, other government facilities influencing the development pattern such as Highways and regional sewerage facilities, and the trends projection of urban land requirements. A very simplified picture of the regional growth pattern is shown in terms of three broad categories urban, open space and farmland. In the case of the "urban" land, a distinction is made in the Plan between officially designated areas, and urban areas added in accordance with declared development paths and other pressures.

The total urban area shown on the Trends Plan is approximately 108,000 acres. This includes the total estimated 1996 land requirements (Table 6.2) plus the land estimated as surplus over the 1996 requirements for each municipality. The Trends Plan is based on the assumption that under present planning policy the excess of demand in one municipality e.g. St. Catharines would not be directed to a surplus in another, e.g. Niagara Falls. Accordingly, on the map the areas of "designated urban development" include these municipality land surpluses.

When the Trends Plan map was overlayed on the "Orchards and Vineyards 1965" map, some 21,000 acres or 46 per cent of the total area (Table 3.5) is covered by urban development, and when the Trends Plan was related to the tender fruit soils, about 17,000 acres or 42 per cent of the total area was affected. It is not difficult to see that at the presently prevailing urban shadow ratio (4.5) of 1 to 1.7 not much of either the orchards or vineyards on the area of tender fruit soil would remain intact.

LIST OF REFERENCES

CHAPTER VI

1. Ontario Department of Municipal Affairs, Annual Report of Municipal Statistics, 1955, 1961 and 1966, (Toronto: Queen's Printer, 1955, 1961 and 1966).

2. The Ontario Committee on Taxation, Vol. II, (Toronto: Queen's Printer, 1967), p. 119.

3. Niagara Region Local Government Review, Report of the Commission, August, 1966, pp. 21-22, 59-62, 82.

CHAPTER VII

A STRATEGY FOR THE FRUIT BELT

This study leads to three broad observations:

(1) that the land resources of the Niagara Fruit Belt are being depleted at an accelerating rate, due equally to the direct use of the land for construction, and the indirect effect through the ownership or occupation of farm properties by people either living or working in the city. Of an original total of 40,210 acres of tender fruit soils, about 26,300 acres (65%) are presently being used for fruit growing as a full time occupation. In less than 30 years, under present trends, full time farming on tender fruit soils will disappear (4.5 and 6.5).

(2) that the core of the fruitlands can still be saved, and future urban growth accommodated, if the indirect impact, the urban shadow, is brought under control, and new directions of urban growth above the Escarpment and off tender fruit soils are developed. Particularly critical is the preservation of the 22,000 acres of tender fruit soils in Clinton, Louth, Niagara and Pelham Townships,

(3) that existing local and provincial policies will not stop progressive depletion of land resources and may inadvertently intensify established trends.

In view of the above, it is concluded that provincial initiative is required to achieve a fundamental change in the approach to the use of the region's resources. The key to that change is the preparation of a regional development plan for the Study area. Within that framework it will be possible to give consideration on a sound basis to the diverse uses of the land. For example, the expansion of cities could be considered not only from the viewpoint of the costs of servicing, but from the viewpoint of the relative costs and benefits of alternative directions of growth, taking into account the quality of the land, and the effects on the private economy of the region.

Critics of Niagara conditions have pointed with some justification to the mountains of studies that have been made of the fruitlands and the larger Niagara Economic Regions.[1] It is not proposed that another study be undertaken. Instead, it is suggested that a highly practical and tightly scheduled programme be commenced as soon as possible, geared to the presentation of a regional development plan within a period of one year from the adoption of this report. This should be a feasible programme because (i) there is a substantial research background - the Regional Development Branch has recently completed an economic review of the five-county Niagara Economic Region, and (ii) the plan, while considering the general economic region, would focus on the critical Fruit Belt Area.

The concerted effort required to carry out this recommendation, suggests that responsibility for preparation of the plan should be assigned to a specially assembled task force, formed within the provincial administration. If the current discussions on the planning system of the Province are resolved at an early date, then the ideal solution would be to assign planning responsibility to the agency which will have the on-going job of preparing comprehensive regional plans. Similarly, at the stage of implementation it will be necessary to relate the administration of the plan to whatever local government restructuring might arise from the Local Government Review. Emphasis is placed on the need for a tightly knit planning team, containing the diversity of talents dictated by the diversity of the region, and working full-time. Given this effective corps it

should be possible to draw in, on an advisory basis, additional expertise from the Universities - Brock, McMaster, and the University of Waterloo. If a panel of advisors is formed, it would be appropriate to select a chairman of that group from Brock University, which is, of course, located in the heart of the Fruit Belt.

The findings of this study suggest certain specific terms of reference for the task force. One is that it try to develop an urban pattern that does not consume the remaining tender fruit soils. Another, and a corollary of the first, is that it give special attention to the feasibility of establishing a new north-south development corridor, which could take the form of a chain of cities along the axis of Highway 406 and the Welland Canal. Finally, to strike at the root of the rural land use problems, the planning task force should be asked to pinpoint the major problems in the farm economy of the area and set out the changes necessary to establish a viable agriculture.

The pace of change in the Fruit Belt is so swift, and the repercussions of individual projects and land use decisions reverberate so widely, that something tangible has to be done to preserve the opportunity for future renewal. Accordingly, it is suggested that the Province establish an internal policy under which Departments concerned would review their programmes as they affect the areas of tender fruit soil (Map 3) with a view to providing the respite necessary for the preparation of a Regional plan. At the same time, whenever it is possible to use the powers of Ministerial review

under the Planning Act of Ontario, it is recommended that the Minister as a matter of policy, attempt to apply a similar strategy to municipal projects in areas of tender fruit soil outside the limits of the Cities and Towns, and in the Township of Saltfleet which is increasingly part of Metropolitan Hamilton. This action will not only be important for its tangible effects, but it will indicate clearly the Province's determination to set the region on a new and more promising path.

LIST OF REFERENCES

CHAPTER VII

1. Legislature of Ontario Debates, April 12, 1962.

APPENDIX A

LIST OF INTERVIEWS

NAME	POSITION
George Johnston	Assessment Branch, Department of Municipal Affairs.
A.M. Luce	Director, Western Region, St. Lawrence Seaway Authority.
Tom Pickersgill	Regional Manager, Central Mortgage and Housing Corporation.
John Stacy	Central Mortgage and Housing Corporation.
G.W. Murchison	Director, Land Development, Ontario Housing Corporation.
Dr. Lloyd G. Reeds	Department of Geography, McMaster University.
L.F. Pitura	Assistant Director, Division of Project Development, Ontario Water Resources Commission.
Keith Bain	Supervisor, Official Plans & Zoning, Community Planning Branch, Department of Municipal Affairs.
Leo Schwabl	Functional Planning Division, Planning Branch, Department of Highways.
Hugh W. Clelland	Functional Planning Division, Planning Branch, Department of Highways.
Dr. H.L. Patterson	Director, Farm Economics, Co-operatives and Statistics Branch, Department of Agriculture & Food.
E.A. Haslett	Associate Director, Farm Economics, Co-operatives and Statistics Branch, Department of Agriculture & Food.
Ollie Bradt	Research Scientist, Horticultural Research Institute of Ontario, Vineland, Department of Agriculture & Food.

NAME	POSITION
Byron E. Beeler	Programme Supervisor, Fruit and Vegetable Extension Service, Department of Agriculture & Food.
Box Wilcox	Extension Specialist, Department of Agriculture & Food.
R.J. Martin	Local Farm Credit Advisor, Farm Credit Corporation, St. Catharines.
A. Pierce	Assistant Assessment Commissioner, Lincoln County Assessment Department, St. Catharines.
Keith Matthie	Secretary-Treasurer, Ontario Tender Fruit Growers' Marketing Board.
O.A. Stirajs	Resource Manager, Niagara Peninsula Conservation Authority.
John F. Doyle	Secretary-Treasurer, Niagara Peninsula Conservation Authority.
Dr. J.N. Jackson	Department of Geography, Brock University, St. Catharines.

APPENDIX B

RECENT LAND USE CHANGES IN THE NIAGARA FRUIT BELT

By:

Ralph R. Krueger
Department of Geography and Planning
University of Waterloo

B.1 INTRODUCTION

In recent years much has been written and spoken about the destruction of the Niagara fruitlands. A number of submissions to H.B. Mayo, the Commissioner of the Niagara Local Government Review expressed concern about the loss of the region's prime agricultural resources. Among those briefs was one from the Institute of Land Use at Brock University, which said:

> ... the rapid urbanization of the Niagara Region poses a serious threat on the continued existence of its agricultural industry... studies have all agreed that there is sufficient space within the peninsula to preserve the heart of the Fruit Belt and to meet the foreseeable needs of urban expansion. Despite this, no official action has yet been taken to limit the destruction of the fruitlands...[1]

In his report, Mayo also quoted from a Provincial Government Report that seemed to indicate that there was no real reason for concern about loss of the Niagara fruitland:

> Although recent years have seen rapid urban expansion in the Niagara Fruit Belt, total tender fruit farm acreage during this period has increased. Although this urban expansion has used up some of the most productive areas, total fruit production has continued to grow.[2]

This quotation is somewhat misleading because it seems to imply that tender fruit production will continue to increase despite urban expansion. Actually, the same report showed that between 1954 and 1958 urban land uses were using up tender fruit soils at a much more rapid rate than during the 1934-1954 period. The report also indicated that in a four year period, more than a thousand acres of orchard has been turned to "other" uses, which category included land

held for speculative purposes. In summary, the Community Planning Branch report showed that, while fruit production was still increasing, the rate of urbanization of tender fruit soil was increasing, and that the urbanization process was indirectly forcing large acreages of orchards out of production. In fact, the report provided more reason for concern for the destruction of the fruitlands than did the detailed study by Krueger in 1959.[3]

Although Mayo states that there is need for a regional authority that will consider the importance of the fruitlands, he indicates that there is lack of recent information concerning the threat of urbanization to the fruitlands.

It is the intent of this report to provide more up to date information about land use trends in the Niagara Fruit Belt. The data used for the writer's last study of the Niagara Fruit Belt[4] was obtained from 1934 and 1954 air photos. The updated maps in this report are based upon 1965 air photos, the most recent available.

B.2 REVIEW OF PHYSICAL FACTORS

The physical suitability of the Niagara Fruit Belt for fruit growing purposes is well known and need not be documented in detail. Suffice it to say that the combination of climate and soils in the Niagara Fruit Belt is superior for tender fruit crops (particularly peaches and sweet cherries) to any other orchard district in Canada and to most United States districts outside of California.[5]

Within the Fruit Belt, however, there are major differences in fruit growing suitability. The eastern end of the Fruit Belt has slightly milder winters than the western end, and those areas

immediately adjacent to the lake have less chance of both winter low temperature injury and spring frost damage. The air drainage afforded by the steep slopes in the Fonthill district of Pelham Township gives that area a surprisingly good fruit climate.

As is indicated in Map 3 (Chapter III), only a portion of the Niagara Fruit Belt has the deep well drained light textured soils (tender fruit soils) required by peach and sweet cherry orchards as well as small fruits and vegetables. While peaches and cherries can be grown successfully only on the tender fruit soils, the other tree fruits and grapes can be grown successfully on both the tender fruit soils and on large acreages of other well drained clay loams in the Niagara Peninsula.[6] Recently, growers have discovered that the new European varieties of grapes used for high quality wines do better on the tender fruit soils, and in a number of cases, orchards have been replaced by grapes on these soils.

It is a fortunate coincidence that the tender fruit soils in the Niagara Fruit Belt are located where the climate for tender fruit crops is most favourable.

B.3 CHANGING ORCHARDS AND VINEYARD PATTERNS

Trends in tree fruit and grape acreages are illustrated by Table B.1.

There was a large increase in tree fruit acreages between 1931 and 1951, but there was a reduction of approximately 10,000 acres of orchard between 1951 and 1966. This represents a decline of about 33 per cent in fifteen years.

TABLE B.1

NIAGARA FRUIT BELT TREE FRUIT AND GRAPE ACREAGES
1931, 1951, 1961, 1966.

	ACRES			
	1931	1951	1961	1966
Apples	4,630	2,210	1,050	1,480
Cherries - Sour	1,800	4,050	2,500	2,060
Sweet			1,600	2,530
Peaches	7,240	13,960	11,000	8,270
Pears	1,910	5,020	5,550	3,450
Prunes & Plums	2,580	4,590	2,800	1,930
TOTAL TREE FRUITS	18,160	29,830	24,500	19,720
Grapes	14,560	19,610	20,500	21,500

Source: Dominion Bureau of Statistics. The 1931 and 1951 statistics are for the Niagara Fruit Belt as defined by Krueger; the 1961 and 1966 statistics are for the whole Niagara Peninsula. Statistics for sour and sweet cherries are not available separately for 1931 and 1951.

The trends in acreages have not been the same for all fruit crops. Cherry acreages have increased almost constantly since 1931. Peach and pear acreages have been declining since 1951; prunes and plums since 1961. Apple acreages declined rapidly until 1961 but increased slightly between 1961 and 1966. Grape acreages increased in every interval since 1931, but the rate of increase has slowed down since 1951.

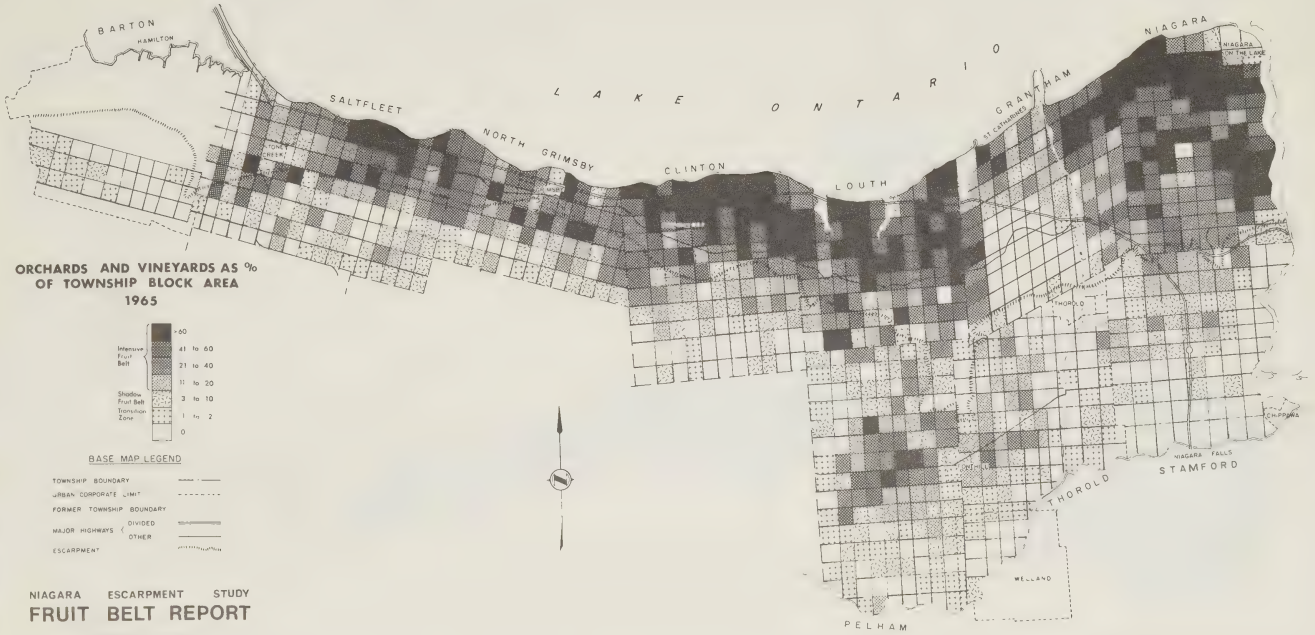
Of considerable significance is the change of peach acreages, because it is for the peach crop that the Niagara Fruit Belt has the greatest comparative physical advantage. Between 1931 and 1951, the peach acreage doubled. However, the peach acreage declined by approximately 4,000 acres between 1951 and 1961, and almost another 3,000 acres between 1961 and 1966.

A series of maps (Maps 8-12), shows the present patterns of orchards and vineyards within the Niagara Fruit Belt, as well as changes in the patterns between 1954 and 1965. These maps include only that part of the Niagara Peninsula defined as the Niagara Fruit Belt by Krueger.[7] Even though some of the townships have been completely annexed by adjacent cities, the township names and original boundaries have been retained for the convenience of reference and comparison. The small blocks are concession blocks and are usually bounded by roads. Within each block the area of a particular land use was measured from air photos, and was computed as a percentage of the total area of the block.

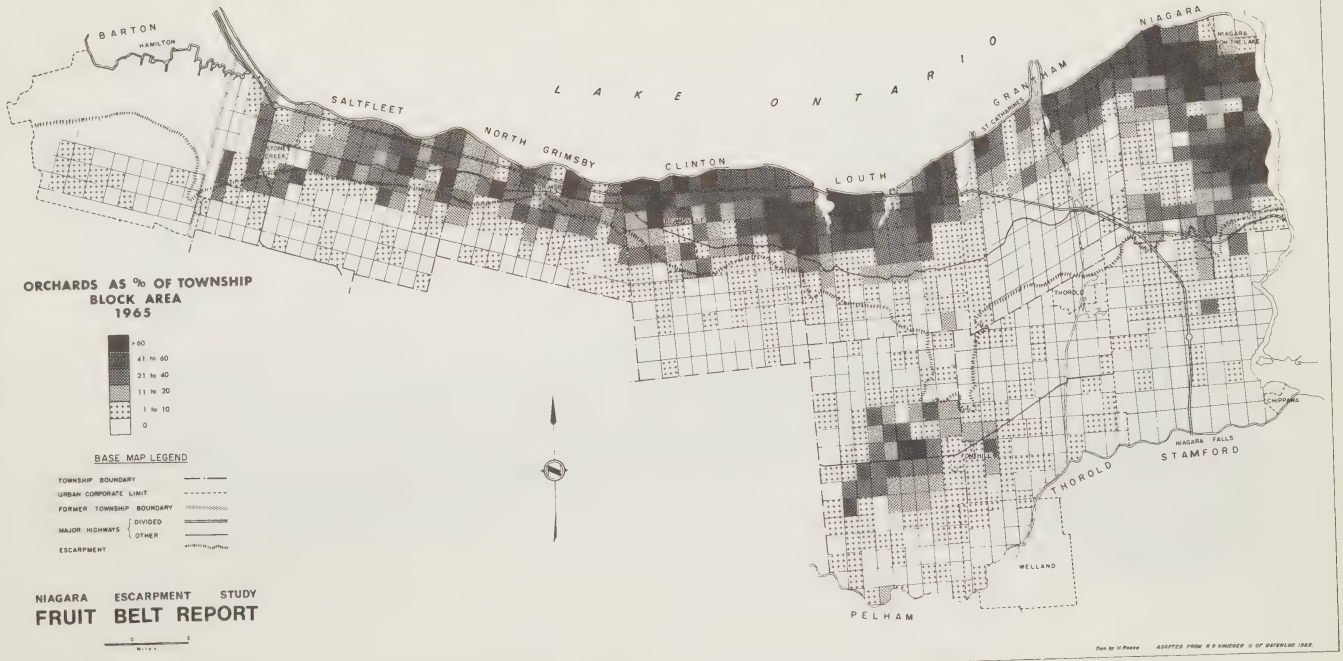
B.3.1 Orchards and Vineyards (Map 8)

It is interesting to note that the intensive fruit growing area is not limited to the lake plain north of the Niagara Escarpment. Areas of very intensive orchard and vineyard are found on the well drained clay loam soils of the Vinemount Moraine that caps the Niagara Escarpment in Saltfleet, North Grimsby, Clinton and Louth Townships, and on the light textured soils of the Fonthill Kame in Pelham Township. Lesser concentrations of fruit growing are found in Thorold

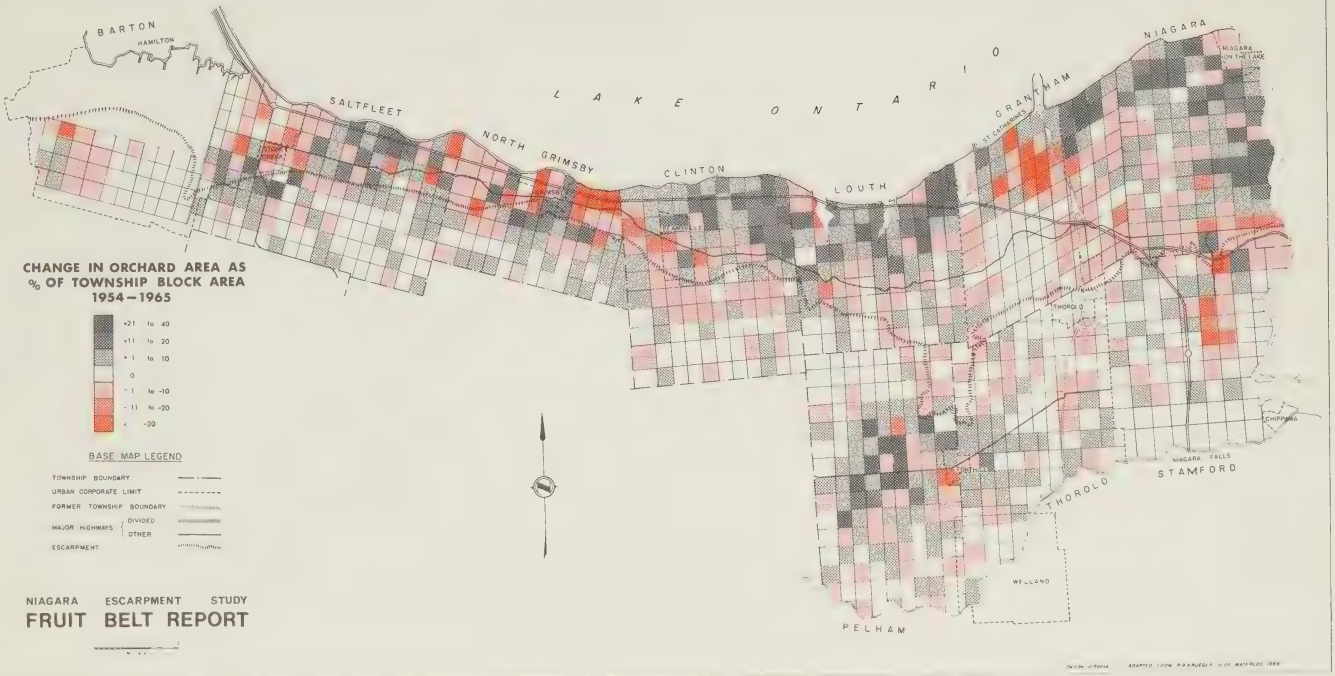
MAP 8


BARTON
HAMILTON
SALTFLEET
NORTH GRIMSBY
CLINTON
LOUTH
GRANTHAM
NIAGARA
NIAGARA ON THE LAKE
ST CATHARINES
THOROLD
NIAGARA FALLS
STAMFORD
CHIPPAWA
WELLAND
PELHAM
LAKE ONTARIO
ORCHARDS AND VINEYARDS AS % OF TOWNSHIP BLOCK AREA 1965
+60
41 to 60
21 to 40
11 to 20
3 to 10
1 to 2
0
Intensive Fruit Belt
Shadow Fruit Belt
Transition Zone
BASE MAP LEGEND
TOWNSHIP BOUNDARY
URBAN CORPORATE LIMIT
FORMER TOWNSHIP BOUNDARY
MAJOR HIGHWAYS
DIVIDED
OTHER
ESCARPMENT
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT
Drawn by U.P.D.S.S.A.
ADAPTED FROM R.R. KRUEGER U. OF WATERLOO 1968

MAP 9


BARTON
HAMILTON
SALTFLEET
STONEY CREEK
NORTH GRIMSBY
CLINTON
LOUTH
LAKE ONTARIO
GRANTHAM
ST CATHARINES
NIAGARA
NIAGARA ON THE LAKE
THOROLD
CHIPPAWA
NIAGARA FALLS
STAMFORD
THOROLD
WELLAND
PELHAM
ORCHARDS AS % OF TOWNSHIP BLOCK AREA 1965
60
41 to 60
21 to 40
11 to 20
1 to 10
0
BASE MAP LEGEND
TOWNSHIP BOUNDARY
URBAN CORPORATE LIMIT
FORMER TOWNSHIP BOUNDARY
MAJOR HIGHWAYS
DIVIDED
OTHER
ESCARPMENT
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT
Drawn by U. Reese
ADAPTED FROM R. R. VANDER V. OF WATERLOO 1968.

MAP 10


BARTON
HAMILTON
SALTFLEET
NORTH GRIMSBY
CLINTON
LOUTH
L A K E O N T A R I O
GRANTHAM
ST CATHARINES
NIAGARA
NIAGARA ON THE LAKE
THOROLD
CHIPPAWA
NIAGARA FALLS
STAMFORD
THOROLD
WELLAND
PELHAM
CHANGE IN ORCHARD AREA AS % OF TOWNSHIP BLOCK AREA 1954–1965
+21 to 40
+11 to 20
+ 1 to 10
0
- 1 to -10
- 11 to -20
< -20
BASE MAP LEGEND
TOWNSHIP BOUNDARY
URBAN CORPORATE LIMIT
FORMER TOWNSHIP BOUNDARY
MAJOR HIGHWAYS
DIVIDED
OTHER
ESCARPMENT
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT

and Stamford Townships. Thus, the Niagara Escarpment literally cuts through the heart of the Niagara Fruit Belt.

B.3.2 Orchards (Maps 9 and 10)

The most dense orchard areas are found on the tender fruit soils on the lake plain, on the Vinemount Moraine that caps the Niagara Escarpment in the western part of the Fruit Belt, and on the Fonthill Kame in Pelham Township. Of the fifty blocks above the Niagara Escarpment with more than 20 per cent of the area in orchard, and of those, fifteen blocks have more than 40 per cent in orchard.

The large increases in orchard acreages have all occurred in the areas that already have intensive orchard in 1954. The large decreases have occurred primarily around cities and towns or along highways. Some of the small decreases can be explained by a shift from orchards to vineyards; others by the demise of farmstead orchards.

B.3.3 Vineyards (Maps 11 and 12)

The most intensive vineyard areas are found on the clay soils of the lake plain from Clinton to Niagara Township. In 1965, the townships of Clinton, Louth, Grantham and Niagara accounted for 55 per cent of the total Niagara Peninsula grape acreage. There are only nine blocks with more than 40 per cent in vineyard above the Niagara Escarpment. However, there is a large number of blocks above the Escarpment with more than 20 per cent in vineyard, and an even larger number above the Escarpment with 11-20 per cent. The 1934-1954 trend to plant grapes above the Escarpment continued in the

MAP 11

BARTON
HAMILTON
SALTFLEET
STONEY CREEK
NORTH GRIMSBY
GRIMSBY
CLINTON
LOUTH
LAKE ONTARIO
GRANTHAM
ST. CATHARINES
NIAGARA
NIAGARA ON THE LAKE
THOROLD
FONTHILL
WELLAND
PELHAM
THOROLD
STAMFORD
NIAGARA FALLS
CHIPPAWA
VINEYARDS AS % OF TOWNSHIP BLOCK AREA 1965
>40
21 to 40
11 to 20
1 to 10
0
BASE MAP LEGEND
TOWNSHIP BOUNDARY
URBAN CORPORATE LIMIT
FORMER TOWNSHIP BOUNDARY
MAJOR HIGHWAYS
DIVIDED
OTHER
ESCARPMENT
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT
0 1 2
Miles
Dwn by U Roose
ADAPTED FROM R.R. KRUEGER U OF WATERLOO 1968


MAP 12
BARTON
HAMILTON
SALTFLEET
NORTH GRIMSBY
CLINTON
LOUTH
L A K E O N T A R I O
GRANTHAM
NIAGARA
NIAGARA ON THE LAKE
ST CATHARINES
THOROLD
CHIPPAWA
NIAGARA FALLS
STAMFORD
WELLAND
PELHAM
CHANGE IN VINEYARD AREA AS
% OF TOWNSHIP BLOCK AREA
1954 – 1965
+21 to 40
+11 to 20
+ 1 to 10
0
- 1 to -10
-11 to -20
< -20
BASE MAP LEGEND
TOWNSHIP BOUNDARY
URBAN CORPORATE LIMIT
FORMER TOWNSHIP BOUNDARY
MAJOR HIGHWAYS
DIVIDED
OTHER
ESCARPMENT
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT

1954-1965 period. By 1965, almost 40 per cent of the grape acreage was located above the Escarpment.

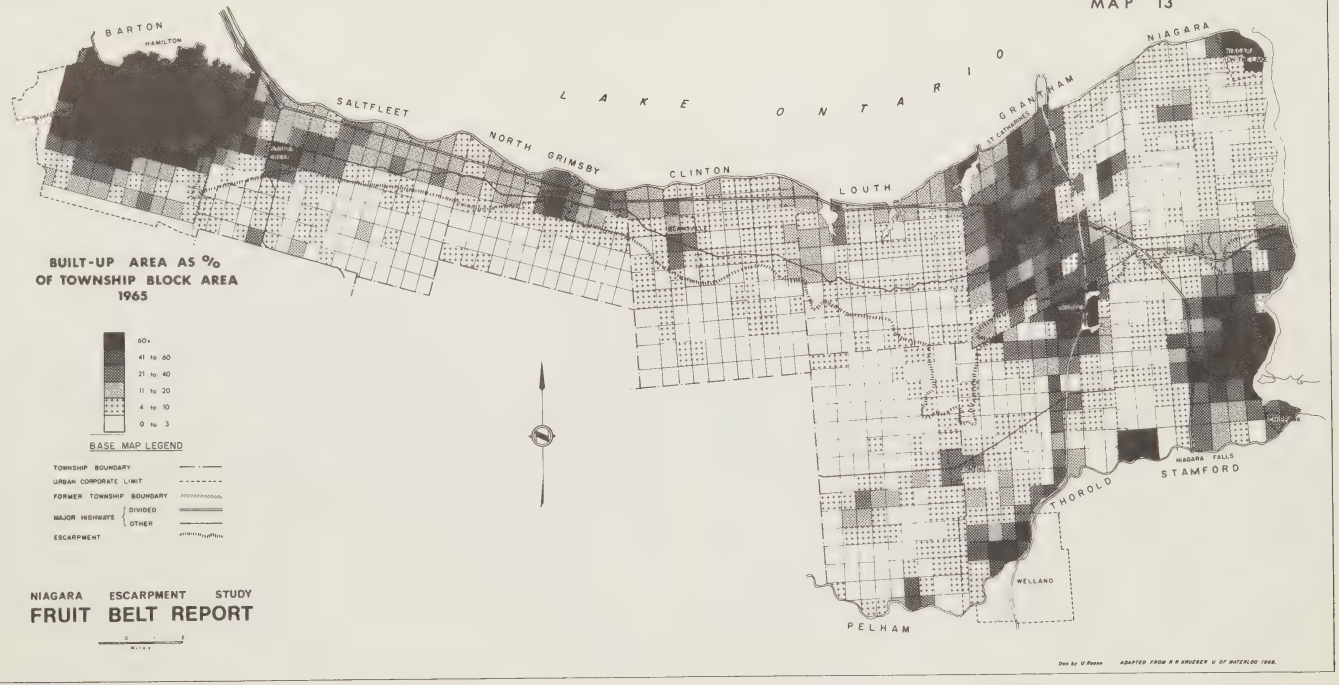
Most of the vineyards (and vineyard increases) have occurred on clay loam soils. However, it is interesting to note that, between 1954 and 1965, there have been some increases of vineyards on tender fruit soils. For example, in the north-east corner of Louth Township, there are a dozen blocks with tender fruit soil that have had vineyard increases, and four of these increases are of more than 10 per cent. This reversal from past trends can be explained by the fact that the newer varieties of European grapes do better on light textured soils, and the net return per acre from these grapes is greater than from peaches.

The decreases in vineyards are widely scattered over the Fruit Belt and are not easy to explain. Some are due to urbanization, some to changes from vineyard to orchard, and others have resulted from farmers deciding to go out of fruit growing altogether.

B.4 BUILT-UP AREAS (Maps 13, 14 and 15).

The term "built-up" includes all non-farm developments such as industrial, commercial, residential, and other urban oriented land uses, including transportation routes. Maps 13 to 15 show the way in which urban type development has spread across most of the Fruit Belt. On the lake plain, only Louth, Grantham (east of the Welland Canal) and Niagara Townships have a significant number of blocks untouched by urban sprawl. Above the Niagara Escarpment, there are still some large areas with relatively little intrusion of non-farm uses.

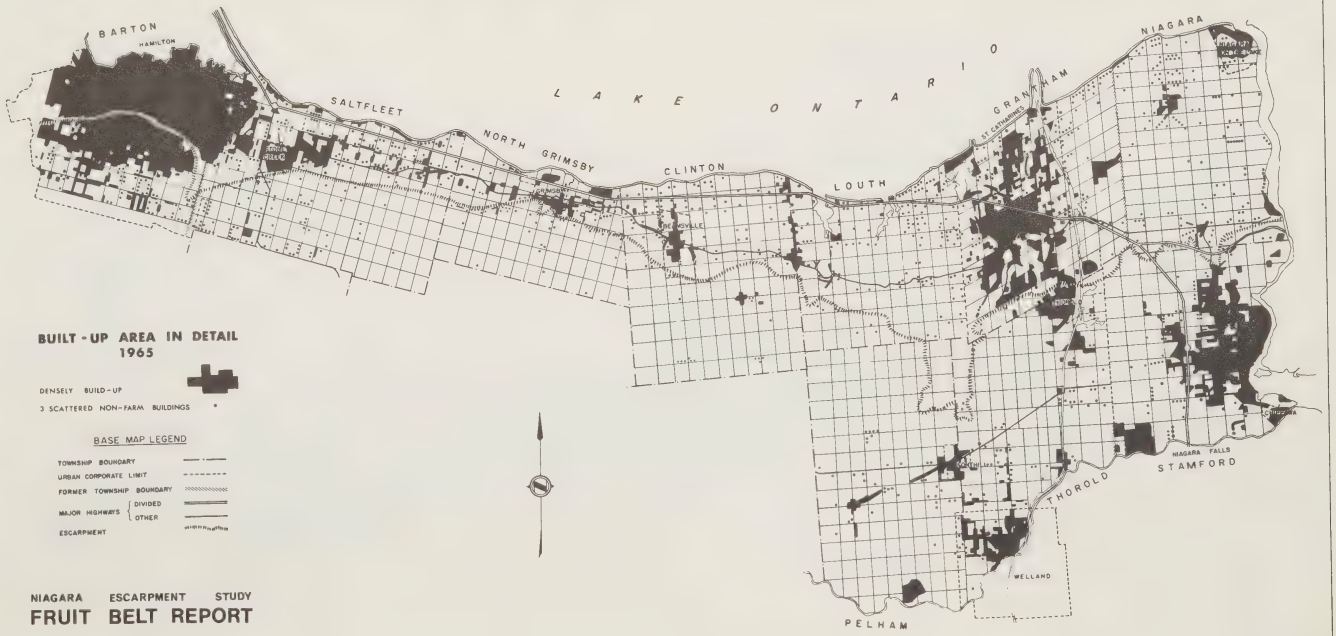
MAP 13


BARTON
HAMILTON
SALTFLEET
NORTH GRIMSBY
CLINTON
LOUTH
L A K E O N T A R I O
GRANTHAM
ST CATHARINES
NIAGARA
THOROLD
NIAGARA FALLS
STAMFORD
WELLAND
PELHAM
BUILT-UP AREA AS % OF TOWNSHIP BLOCK AREA 1965
60+
41 to 60
21 to 40
11 to 20
4 to 10
0 to 3
BASE MAP LEGEND
TOWNSHIP BOUNDARY
URBAN CORPORATE LIMIT
FORMER TOWNSHIP BOUNDARY
MAJOR HIGHWAYS
DIVIDED
OTHER
ESCARPMENT
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT
Drn by U Roose
ADAPTED FROM R R KRUEGER U OF WATERLOO 1968.

MAP 14


BARTON
HAMILTON
SALTFLEET
NORTH GRIMSBY
CLINTON
LOUTH
GRANTHAM
NIAGARA
NIAGARA ON THE LAKE
LAKE ONTARIO
ST CATHARINES
GRIMSBY
BEAMSVILLE
THOROLD
FONTHILL
WELLAND
PELHAM
THOROLD
STAMFORD
NIAGARA FALLS
CHIPPAWA
CHANGE IN BUILT - UP AREA AS % OF TOWNSHIP BLOCK AREA 1954 – 1965
> 40
21 to 40
11 to 20
2 to 10
0 to 1
BASE MAP LEGEND
TOWNSHIP BOUNDARY
URBAN CORPORATE LIMIT
FORMER TOWNSHIP BOUNDARY
MAJOR HIGHWAYS
DIVIDED
OTHER
ESCARPMENT
NIAGARA ESCARPMENT STUDY
FRUIT BELT REPORT
0
2
Dwn by U Roose
ADAPTED FROM R R KRUEGER U OF WATERLOO 1968

MAP 15



BUILT-UP AREA IN DETAIL 1965

DENSELY BUILD-UP

3 SCATTERED NON-FARM BUILDINGS

BASE MAP LEGEND

TOWNSHIP BOUNDARY

URBAN CORPORATE LIMIT

FORMER TOWNSHIP BOUNDARY

MAJOR HIGHWAYS { DIVIDED, OTHER }

ESCARPMENT

NIAGARA ESCARPMENT STUDY

FRUIT BELT REPORT

0 1 2 MILES

Dwn. by V Peters ADAPTED FROM R B KRUEGER, U. OF WATERLOO 1968.

The overall visual impact of Map 15 is on low-density, scattered urban development, with several nodal concentrations and some corridor tendency. This pattern of development raises several important questions: (i) What has been the impact of this pattern of urbanization on the prime fruit lands of the Niagara Fruit Belt? (ii) How long can the Niagara fruit growing industry survive if these trends continue? (iii) Are other patterns of urban development desirable and feasible?

B.5 IMPACT OF URBANIZATION ON THE FRUIT GROWING INDUSTRY

In Table B.1, it was shown that orchard acreages increased up until 1951, at which time a decline set in. While it is very difficult to assess the precise degree of the significance of urbanization as a factor in this decline there is little doubt that it is an important one. In an industry which has been caught in a tight "cost-price squeeze," which suffers from instable price conditions, and which faces stiff competition from foreign imports, in many cases the urbanization factor may very well be the "straw that breaks the camel's back." While inertia may be enough to keep a farmer in business despite poor returns from his investment and labour, if he has the opportunity of selling out at a good price, he may not wish to establish another farm operation.

The direct affect of urbanization, i.e. the uprooting of orchards and vineyards for urban land uses, is very obvious. However, there are many indirect effects. Many orchards, although not destroyed, are abandoned as commercial enterprises by owners holding the land

for speculative purposes.[8] High land prices that reflect the return from urban uses rather than agricultural activities, discourage them from buying additional land that is required in order to create economic sized units. Since the urbanites who come into a rural municipality demand increased urban-type services disproportionate to the increase of tax assessment, the urbanization brings with it a heavy tax burden to the farmers.[9] Also, productivity is reduced in the farmland within the urban shadow, because the prospects of an early sale for urban purposes discourage long term investments such as planting a new orchard that will not come into full production for a number of years.

Up until 1951 the intensification of orcharding in areas remote from the cities was so great that any losses due to urbanization were more than being replaced by new plantings. However, since 1951 the losses due to urbanization have been greater than the amount of new plantings.

If the 1951-1966 rate of orchard decline of 674 acres a year were to continue, by 1980, there would be about 10,000 acres of orchard remaining, and all orchards would disappear shortly before the year 2000.

According to acreage trends, grapes do not face the same threat of extinction as do orchards. There was approximately a 2,000 acre increase between 1951 and 1966. This increase reflects improved profits to grape growers in recent years as well as the availability of large acreages of land suitable for grapes in areas

beyong the urban shadow.

B.6 TENDER FRUIT SOIL ORCCUPED BY URBAN EXPANSION

The amount of tender fruit soil occupied by urban expansion (Table B.2) is even more significant than the decrease of orchard acreage, because this soil, of which there is a limited amount in the Niagara Fruit Belt, is the only type on which the major fruit crop of peaches can be grown profitably. It is these tender fruit soils areas that have the climatic and edaphic combination that make the Niagara Fruit Belt the most valuable horticultural land in Canada. The loss of tender fruit soil is not just a loss of orchards; it is the loss of an irreplaceable resource.

Between 1934 and 1954, urban expansion occupied 2,710 acres of tender fruit soil; between 1954 and 1965, urban expansion occupied 2,360 acres. Thus, while the rate in the earlier period was 135 acres per year, in the later period it was 215 acres per year.

It is important to note that the totals in Table B.2 include only actual areas occupied by urban uses. They do not include the amount of land taken out of production as a result of real-estate speculation that accompanies urban expansion into a rural area. If we accept the estimate that with present sprawl patterns, for every acre used for urban purposes, two acres are ruined for agricultural use, then the real loss of tender fruit soil between 1954 and 1965 was 4,720 acres, or 430 acres a year.[10]

Unfortunately, most of the tender fruit soil is in the path of the low density urban corridor rapidly developing along the lake

TABLE B.2

NIAGARA FRUIT BELT ACREAGES OF TENDER FRUIT SOIL OCCUPIED BY URBAN EXPANSION

Township	1934-1954	1954-1965	1934-1965
Saltfleet	1,050	800	1,850
North Grimsby	100	160	260
Clinton	40	90	130
Louth	140	130	270
Grantham	860	700	1,560
Niagara	140	100	240
Pelham	80	60	140
Thorold	10	20	30
Stamford	290	300	590
TOTAL	2,710	2,360	5,070

Source: Air Photos taken in 1934, 1954 and 1965.

plain. Any major new service such as another four lane highway or extensive sewer facilities on the lake plain would greatly accelerate this corridor development and the attendant destruction of the tender fruit soil.

In Saltfleet, Grantham, and Stamford Townships, the urbanization process has gone so far that there is no chance of preserving significant acreages of tender fruit soil.[11] North Grimsby is rapidly approaching the same stage. However, in Clinton, Louth, Niagara and

Pelham Townships there are large acreages of tender fruit soil where the urbanization processes are at a sufficiently early stage that there are still prospects of saving the prime fruitland for agriculture. There are approximately 22,000 acres of tender fruit soils in these four townships. This acreage could more than accommodate all of the peaches, sweet cherries, grapes requiring light textured soils, and small fruits and vegetables now being grown in the Niagara Fruit Belt. Thus, if these key areas can be preserved from further urban expansion, the fruit growing industry can be saved. The prevention of further major urban expansion in these townships would not in any way inhibit urban development in the region. In fact, without touching the above townships, there is sufficient urban space to accommodate well over one million people in the area - a population that is not likely to be achieved until after the year 2000.

LIST OF REFERENCES

APPENDIX B

1. H.B. Mayo, Niagara Region Local Government Review, Report of the Commission, Department of Municipal Affairs, Toronto 1966, p.21.

2. Mayo, p.21 quoting The Niagara Area, Changing Land Uses, Community Planning Branch, Ontario Department of Municipal Affairs, Toronto, July, 1961.

3. R.R. Krueger, Changing Land Use Patterns in the Niagara Fruit Belt, Transactions of the Royal Canadian Institute, Vol.XXXII, No.67, Part II, Toronto, 1959.

4. Ibid.

5. For a detailed comparison of the physical characteristics, production statistics, and problems and trends of all orchard regions in Canada, see R.R. Krueger, "The Geography of the Orchard Industry of Canada," Geographical Bulletin, Vol. 7, No.1, 1965. A summary of this article is found in R.M. Irving (ed.) Readings in Canadian Geography, Holt, Reinehart and Winston, Toronto, 1968.

6. The methodology of classifying the Niagara soils for fruit growing capability is provided in R.M. Irving (ed.), Factors Affecting Land Use in a Selected Area in Southern Ontario - A Land Use and Geographic Survey of Louth Township in Lincoln County, Ontario, Department of Agriculture, Toronto, Ontario, 1957. (This study, commonly called the Louth Report, is available from the Department of Soils, O.A.C., Guelph University, Guelph, Ontario.

7. R.R. Krueger, Changing Land Use Patterns in the Niagara Fruit Belt. Transactions of the Royal Canadian Institute, Vol. XXXII, No.67, Part II, Toronto, 1959.

8. An air photo orchard census conducted by D.K. Erb, Department of Geography and Planning, University of Waterloo, indicated that in 1965 there were 2,716 acres of abandoned orchard in the Niagara Fruit Belt. See Byron E. Beeler, "Niagara District Tree Fruit and Vine Census, 1965 Aerial Photography," Report given at the Annual Convention of the Niagara Peninsula Fruit and Vegetable Growers Association, November 30, 1966.

9. See Krueger, R.R., "The Rural-Urban Fringe Taxation Problem: A Case Study of Louth Township," Land Economics, XXXIII, No.3, August, 1957.

10. For a discussion of the impact or urbanization on agricultural land see: Gertler, L.O. and Hindsmith, J., "The Impact of Urban Growth on Agricultural Land: A Pilot Study," and Crerar, A.D., "The Loss of Farmland in the Growth of Metropolitan Regions of Canada." Both papers are in the Resources for Tomorrow background papers, Supplementary Volume, Queen's Printer, Ottawa, 1962.

11. Note that the township names and boundaries as they existed in the 1950's are being used. St. Catharines now contains all of "Grantham Township" west of the Welland Canal, and Niagara Falls has annexed all of "Stamford Township."

APPENDIX C

RURBAN PROPERTIES BY MUNICIPALITY

C.1 FURTHER ANALYSIS OF THE LOCATION OF RURBAN PROPERTIES

C.1.1 Saltfleet, Thorold, Niagara and Pelham Townships

Saltfleet, Niagara, Pelham and Thorold Townships have the largest acreages occupied by rurban properties with a combined total of 34,352.3 acres (66.5%). However, the distribution of acreage amongst the different property types varies in these townships. This variation provides an indication of the type of urban pressure being experienced by the municipality and the quality of the land for farming.[1]

Over 88 per cent of Saltfleet Township's properties are in two categories, urbanite and resident farms (Table C.1). Land is purchased for two primary reasons in this Township. First, the urbanite farms are owned by speculators who hope to reap some return from the expansion of Hamilton. Secondly, land is purchased by people who work in Hamilton but wish to reside in the country. It was noted that a large number of the resident farms are owned by employees of the steel plants. The small number or rurban properties which are farmed is indicative of the quality of the land. Only 4.2 per cent of the total acreage is tender fruit soil[2] (Table 4.6) and almost 76 per cent of the 9,073 acres are located south of the Escarpment where the soil and climatic factors are not as favourable for fruit farming.

Thorold Township is very similar to Saltfleet Township in that it is experiencing the same type of urban pressures. Expansion of the cities of St. Catharines and Welland and the Town of Thorold

as well as the poor capability of the land for fruit cultivation have resulted in urbanite and resident farms accounting for 77 per cent of the total acreage in the five property types (Table C.8).

The use of tender fruit soil for farming has almost ceased. By 1965, there were 1,080 acres available for fruit growing.[3] A further 759 acres are occupied by rurban properties (Table 4.7) with 459 acres of this figure in resident farms (Table C.8). Thus, there is less than 300 acres of tender fruit soil available for full-time farming which is 700 acres below Krueger's suggested acreage for tender fruit soil in Thorold Township.[4]

The rurban properties in Niagara and Pelham Townships have resulted from a different combination of circumstances. Both townships have large acreages of tender fruit soil resulting in the continued use of the land either by a tenant or on a part-time basis. Furthermore, the eastern part of the Niagara Fruit Belt enjoys the most favourable tender fruit climate. Thus, Niagara Township has 1,400 acres in part-time farms and Pelham Township has 2,400 acres (Tables C.6 and C.7), of which 579 acres and 415 acres respectively are tender fruit soils.

There is a large acreage in urbanite farms in both townships. However, Niagara Township has a larger total, 3,519 acres compared to 2,211 acres for Pelham Township (Tables C.6 and C.7). Proximity to St. Catharines, and the purchase of large parcels of farmland by the St. Lawrence Seaway Authority for the relocation of the Welland Canal, accounts for the greater representation of urbanite

farms in the former municipality. Niagara Township also has 3,328 acres in resident farms. The owners of resident farms are economically orientated towards the urban centres of St. Catharines and Niagara Falls.

On the other hand, Pelham Township is relatively remote from a large urban centre, but it still has 2,840 acres in resident farms. This is the result of a number of factors, the most important of which is the low price of land. An acre of land costs from $350 for idle land to $1,300 for orchards and vineyards with buildings, while a similar range for Niagara Township would be $600 to $2,250. Idle land in neighbouring Thorold Township costs $1,500 per acre. The amenities of the Pelham Township - rolling terrain, orchards and vineyards and sandy soil - are other factors attracting people to this part of the fruitlands. These reasons also account for the large number of residential holdins in the Township. In this classification there are 128 properties covering 1,060 acres (Table C.7): considerably more than any other municipality.

One further aspect about Niagara and Pelham Township should be mentioned. These townships contain 60 per cent of the Peninsula's tender fruit soil occupied by rurban properties (Table 4.7). However, only 347 acres[5] out of the townships' 5,283 acres are held in residential holdings; the property type on the rural-urban continuum farthest removed from being actual farmland. Therefore, it would be possible for a large portion of the 5,283 acres to revert to full-time fruit farming.

C.1.2 Other Municipalities

The remaining municipalities have land in each of the five categories (Table 4.6 and Appendix C). However, the most significant category is urbanite farms. Approximately 50 per cent of the total acreage is rurban properties in North Grimsby, Clinton and Louth Townships and the City of Niagara Falls is occupied by urbanite farms.

The five property types occupy 924 acres of tender fruit soil in Louth Township (Table 4.7) of which 600 acres are in urbanite or tenant-urbanite farms. The other municipalities all have varying acreages of rurban properties on tender fruit soil (Table 4.7).

TABLE C.1

RURBAN PROPERTIES

SALTFLEET TOWNSHIP[b]

	ALL ACREAGE				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No.of Properties	Average Size (acres)	Total (acres)	No.of Properties	Average Size (acres)
Residential Holdings	80.7	0.9	8	10.1	-	-	-
Urbanite Farms	4,219.7	46.5	190	22.2	178.0	14	12.7
Tenant-Urbanite Farms	544.8	6.0	16	34.0	49.3	2	24.7
Resident Farms	3,769.7	41.5	168	22.4	130.0	12	10.8
Part-time Farms	458.0	5.0	15	30.5	21.6	2	10.8
TOTAL	9,072.9	100.0[a]	397	22.9	378.9	30	12.6

[a] Due to rounding may not add to 100.0 percent

[b] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

TABLE C.2

RURBAN PROPERTIES

NORTH GRIMSBY TOWNSHIP[b]

	ALL ACREAGE				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No. of Properties	Average Size (acres)	Total (acres)	No. of Properties	Average Size (acres)
Residential Holdings	7.8	0.3	1	7.8	-	-	-
Urbanite Farms	1,262.8	49.0	58	21.8	81.3	9	9.0
Tenant-Urbanite Farms	260.2	10.1	6	43.4	-	-	-
Resident Farms	761.3	29.5	35	21.8	56.0	7	8.0.
Part-time Farms	284.9	11.1	18	15.8	40.3	5	8.1
TOTAL	2,577.0	100.0[a]	118	21.8	177.6	21	8.5

[a] Due to rounding may not add to 100.0 percent

[b] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

TABLE C.3

RURBAN PROPERTIES

CLINTON TOWNSHIP[a,d]

	ALL ACREAGE				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No.of Properties	Average Size (acres)	Total (acres)	No.of Properties	Average Size (acres)
Residential Holdings	5.2	-[b]	1	5.2	-	-	-
Urbanite Farms	2,557.0	45.8	106	24.1	195.2	13	15.0
Tenant-Urbanite Farms	312.0	5.5	8	39.0	-	-	-
Resident Farms	1,476.8	26.2	108	13.7	191.5	22	8.7
Part-time Farms	1,277.4	22.7	50	25.5	95.4	8	11.9
TOTAL	5,628.4	100.0[c]	273	20.6	482.1	43	11.2

[a] Figures include 265 acres in the town of Beamsville

[b] Less than 0.05 percent

[c] Due to rounding may not add to 100.0 percent

[d] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

TABLE C.4

RURBAN PROPERTIES

LOUTH TOWNSHIP[b]

	ALL ACREAGE				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No. of Properties	Average Size (acres)	Total (acres)	No. of Properties	Average Size (acres)
Residential Holdings	264.2	9.9	33	8.0	86.9	13	6.7
Urbanite Farms	1,001.9	37.6	41	24.5	332.9	17	19.6
Tenant-Urbanite Farms	441.6	16.6	14	31.6	266.9	10	26.7
Resident Farms	498.2	18.7	30	16.6	87.0	9	9.7
Part-time Farms	460.4	17.3	32	14.4	150.7	16	9.4
TOTAL	2,666.3	100.0[a]	150	17.8	924.4	65	14.2

[a] Due to rounding may not add to 100.0 percent

[b] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

TABLE C.5

RURBAN PROPERTIES

ST. CATHARINES[b]

	ALL ACREAGE				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No. of Properties	Average Size (acres)	Total (acres)	No. of Properties	Average Size (acres)
Residential Holdings	87.7	5.6	12	7.3	32.2	5	6.4
Urbanite Farms	405.2	25.9	18	22.5	146.2	8	18.3
Tenant-Urbanite Farms	102.4	6.5	6	17.1	86.8	5	17.4
Resident Farms	706.8	45.2	40	17.7	237.1	21	11.3
Part-Time Farms	262.4	16.8	14	18.7	61.2	5	12.2
TOTAL	1,564.5	100.0[a]	90	17.4	563.5	44	12.8

[a] Due to rounding may not add to 100.0 percent

[b] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

TABLE C.6

RURBAN PROPERTIES

NIAGARA TOWNSHIP[b]

	ALL ACREAGE				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No. of Properties	Average Size (acres)	Total (acres)	No.of Properties	Average Size (acres)
Residential Holdings	49.1	0.6	5	9.8	-	-	-
Urbanite Farms	3,518.8	40.4	142	24.9	674.9	37	18.2
Tenant-Urbanite Farms	358.8	4.1	8	44.9	99.3	5	19.9
Resident Farms	3,328.1	38.2	281	11.8	1,290.6	125	10.3
Part-Time Farms	1,455.6	16.7	94	15.5	579.0	47	12.3
TOTAL	8,710.4	100.0[a]	530	16.4	2,643.8	214	12.4

[a] Due to rounding may not add to 100.0 percent

[b] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

TABLE C.7

RURBAN PROPERTIES

PELHAM TOWNSHIP[a,c]

	ALL ACREAGE				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No. of Properties	Average Size (acres)	Total (acres)	No. of Properties	Average Size (acres)
Residential Holdings	1,060.4	11.7	128	8.3	347.2	53	6.6
Urbanite Farms	2,211.0	24.4	81	27.3	758.9	35	21.7
Tenant-Urbanite Farms	407.6	4.5	5	81.5	239.2	2	119.6
Resident Farms	2,941.3	32.5	108	27.2	878.7	44	20.0
Part-time Farms	2,425.6	26.8	61	39.8	415.1	20	20.8
TOTAL	9,045.9	100.0[b]	383	23.6	2,639.1	154	17.1

[a] Figures include 100.8 acres in the Village of Fonthill

[b] Due to rounding may not add to 100.0 percent

[c] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

TABLE C.8

RURBAN PROPERTIES

THOROLD TOWNSHIP[b]

	ALL ACREAGE				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No. of Properties	Average Size (acres)	Total (acres)	No. of Properties	Average Size (acres)
Residential Holdings	264.2	3.5	29	9.1	42.5	4	10.6
Urbanite Farms	3,447.1	45.8	78	44.2	72.6	5	14.5
Tenant-Urbanite Farms	611.7	8.1	9	68.0	111.9	2	55.9
Resident Farms	2,345.9	31.2	99	23.7	458.7	19	24.1
Part-time Farms	854.8	11.4	23	37.2	73.5	1	73.5
TOTAL	7,523.7	100.0[a]	238	31.6	759.2	31	24.5

[a] Due to rounding may not add to 100.0 percent

[b] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

TABLE C.9

RURBAN PROPERTIES

CITY OF WELLAND[b]

	ALL ACREAGE				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No. of Properties	Average Size (acres)	Total (acres)	No. of Properties	Average Size (acres)
Residential Holdings	17.8	3.8	3	6.0	-	-	-
Urbanite Farms	186.6	40.2	6	31.1	-	-	-
Tenant-Urbanite Farms	124.9	26.9	2	62.4	-	-	-
Resident Farms	134.8	29.0	4	33.7	-	-	-
Part-time Farms	-	-	-	-	-	-	-
TOTAL	464.1	100.0[a]	15	30.9	-	-	-

[a] Due to rounding may not add to 100.0 percent

[b] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

TABLE C.10

RURBAN PROPERTIES

NIAGARA FALLS[b]

	ALL ACREAGES				TENDER FRUIT ACREAGE		
	Total (acres)	% of Total	No. of Properties	Average Size (acres)	Total (acres	No. of Properties	Average Size (acres)
Residential Holdings	897.6	20.6	32	28.1	20.0	3	6.7
Urbanite Farms	2,077.3	47.6	46	45.2	12.0	1	12.0
Tenant-Urbanite Farms	98.0	2.2	2	49.0	-	-	-
Resident Farms	1,044.1	23.9	36	29.0	85.1	5	17.0
Part-time Farms	249.7	5.7	9	27.8	-	-	-
TOTAL	4,366.7	100.0[a]	125	34.9	117.1	9	13.0

[a] Due to rounding may not add to 100.0 percent

[b] Basic data from Assessment Cards in the Municipality and Soil Surveys of Ontario.

APPENDIX D

STANDARDS METHOD OF ESTIMATING 1996 URBAN LAND REQUIREMENTS

STANDARDS METHOD OF ESTIMATING 1996 URBAN LAND REQUIREMENTS

As a check on the existing density method presented in 5.2, urban land requirements were also determined for 1996 on the basis of currently operative planning standards for new urban development and the population estimates outlined in Section 5.1. The standards, which are of necessity very generalized and broad, are described below and listed as part of the accompanying table.

The suggested standards evolved out of a review of a wide range of accepted planning standards[1] which, in turn, were related to the nature of development tendencies in the Study Area. The standards are considered to be attainable within the framework of the existing and emerging regional structure.

The "standards method" can best be viewed as establishing a ready reference for an early estimation of proper regional design and providing an essential basis for reviewing current trends. The results of "standards method" are outlined in Table D.1.

D.1 SUMMARY OF STANDARDS

D.1.1 Residential Standard

Two broad residential density ratios[2] were developed after a review of residential planning standards for new urban development and the relationship of these standards to 1966 residential density factors in the Study Area. The residential density factors are summarized as follows:

	Persons/Dwelling Unit	Dwelling Unit/ Gross acre	Persons/ gross acre	Gross acres/ 1,000 persons
St. Catharines, Welland, Niagara Falls, and Hamilton	3.8 *DBS	6.6	25	40
Townships	3.8	5.3	20	50

This two tier form of classification system takes into account the lower type of residential development characteristic of rural areas. It is a reflection of the residential density range mentioned in 5.3.1.

D.1.2 Industrial Standard

A standard of 10 workers per industrial acre was developed as a factor to estimate future industrial expansion.

A review of the 1966 industrial employment situation in the Niagara Fruit Belt revealed the following:

(1) Working force in the Study Area is some 35% of total population.

(2) Workers in industrial areas comprise some 36% of the total working force.

(3) The ratio of employment in heavy industry versus light industry is approximately 65:35.

According to the standards developed by the Inter-county Regional Planning Commission, Denver, Colorado, the ratios of workers per gross acre of industrial land are 8 and 28 for heavy and light industry respectively.[3] A density ratio of approximately

TABLE D.1

URBAN LAND REQUIREMENTS BY MUNICIPALITY
BASIS: STANDARDS (1966 TO 1996)

	Industrial[a]	Commercial[b]	Residential[c]	Recreational[d]	TOTAL[e]
TOWNSHIPS					
Niagara	240	19	943	376	1,753
Louth	93	8	365	145	679
Clinton	158	12	614	245	1,143
North Grimsby	409	43	1,591	636	2,977
Saltfleet	682	83	2,658	1,062	4,983
Thorold	204	16	793	317	1,518
Pelham	112	9	434	174	810
CITIES					
Niagara Falls[f]	547	175	1,721	860	3,670
St. Catharines	1,233	174	3,841	1,920	7,964
Welland	528	42	1,646	822	3,642
Hamilton	2,929	456	9,140	4,570	18,994
NIAGARA FRUIT BELT	7,135	1,037	23,746	11,127	48,133

[a] Standard of 10 workers/gross acre of industrial land

[b] Standards of (1) 1 acre/1,000 population for neighbourhood shopping centres (Minimum population of 4,000 to support centre)
(2) .75 acre/1,000 population for community shopping centres (minimum population of 35,000 to support centre)
(3) .67 acres/1,000 population for district centres (minimum population of 150,000 required to support centre)

[c] Standards of (1) 25 persons/gross acre of residential for cities of St. Catharines, Niagara Falls and Welland.
(2) 20 persons/gross acre of residential for townships. (The gross residential figure does not include recreational and industrial land or commercial development in the form of shopping centres)

[d] Standard of 20 acres of recreation land/1,000 population

[e] Total figures include 10 per cent of total urban - built-up area for transportation and utility land use.

[f] Niagara Falls commercial totals adjusted upward to take into account tourist commercial land needs.

10.5 workers per acre of industrial land results from the application of this standard to the 1966 industrial employment structure and 1996 population estimates for the Fruit Belt.

At the present time, the four cities have an average of approximately 9 workers per acre of industrial land and the townships on the whole have a much smaller ratio (Table 5.2). On this basis, it was assumed that a standard of 10 workers per acre of industrial land allows sufficient flexibility to account for the expected relative decline in industrial employment, the narrowing of the ratio of heavy to light industry, and the increased space requirements for parking, expansion and one level operation.

D.1.3 Commercial Standard

All commercial land requirements except for development in the form of planned shopping centres is included in gross residential. Shopping centre acreage standards from the Inter-County Regional Planning Commission, Denver, Colorado were adopted for the purpose of estimating commercial land needs under the standards approach.

These are listed as follows:

(1) One acre per 1,000 population for neighbourhood shopping centres (minimum population of 4,000 to support the centre).

(2) 0.75 acres per 1,000 population for community shopping centres (minimum population of 35,000 to support the centre).

(3) 0.67 acres per 1,000 population for regional shopping centres (minimum population of 150,000 required to support the centre).

D.1.4 Recreation Standard

A standard of 20 acres per 1,000 population[4] was adopted for estimating 1996 recreational land needs for the region. The "standards method" allocates future recreational land requirements on the basis of estimated population growth in each municipality.

D.1.5 Transportation and Utility Standard

As outlined in 5.2, a constant of 10 per cent of the total urban built-up area was used as a projection factor to determine transportation and utility land requirements. This standard was developed after reviewing available information on transportation and utility density ratios in the Study Area[5] and density factors compiled elsewhere.[6]

LIST OF REFERENCES

APPENDIX D

1. It was found that the detailed planning standards outlined by the Inter-County Regional Planning Commission, Denver, Colorado in Standards for New Urban Development, 1961, were most useful in the formulation of a set of appropriate development standards for the purposes of this Study. This was based on the fact that the "Colorado Standards":

   (a) were developed as a "universal set of standards" for all forms of new urban development

   (b) introduce variables such as population, population density, and distance from an established urban area

   (c) can easily be adapted to a more regional type of approach in the determination of land requirements

   (d) provide a framework in which they could be effectively modified to accommodate known development tendencies within the Study Area.

2. Gross residential consists of the total area occupied by residential land including roads, parking, schools, churches, and other institutional land uses and all commercial development except planned shopping centres. It does not include private or public recreational open space.

3. Inter-County Regional Planning Commission, Standards for New Urban Development, Denver, Colorado, 1960, p. 8.

4. Ontario Department of Education, Community Programmes Division, Standards and Definitions of Terms Used in the Planning of Public Parks and Public Recreation Areas, Toronto, 1968, p. 8.

5. Welland Area Planning Board, Land Use Areas for Welland 1964 and Selected Urban Centres, Niagara Region, 1961, Welland: Welland Area Planning Board, 1965.

6. Metropolitan Toronto and Region Transportation Study, Choices for a Growing Region, Toronto: Department of Municipal Affairs, November, 1967, p. 19.

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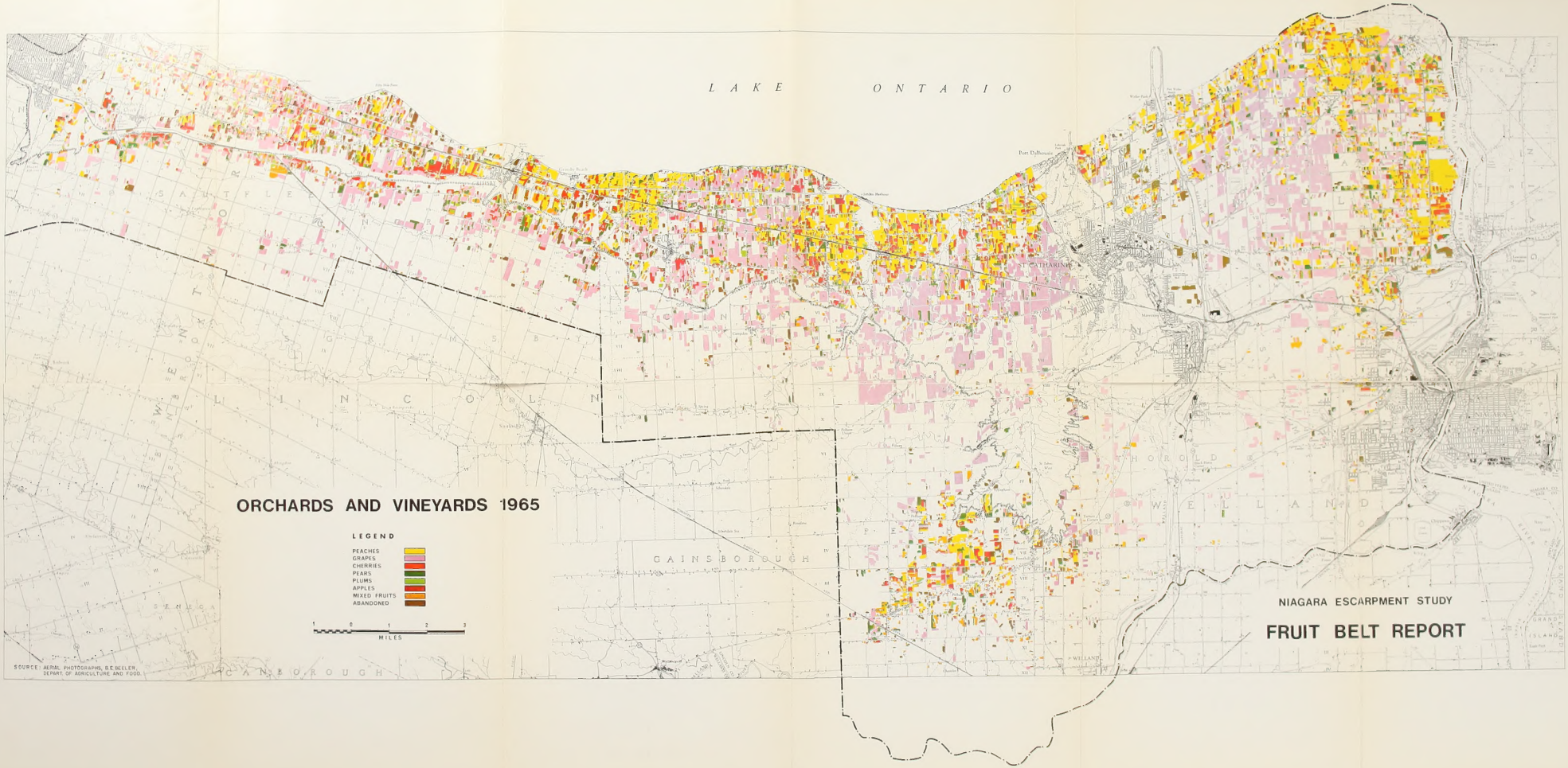
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